FACTORY

MANAGEMENT AND MAINTENANCE

APRIL 1958

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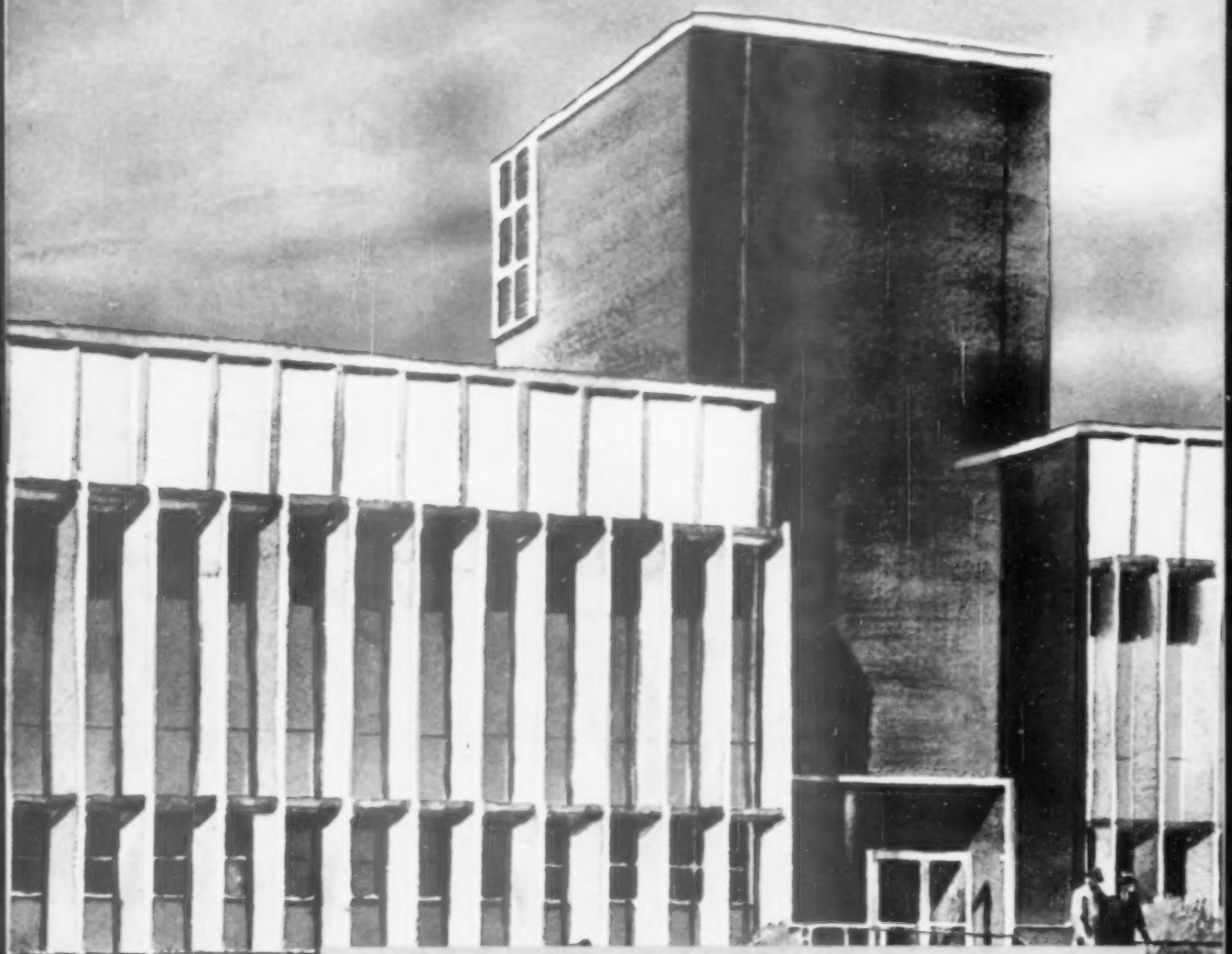


1958 Wage Forecast:

LABOR COSTS GOING UP! . . . . . p. 84

MAKING A COMPUTER WORK —AND PAY OFF . . . . p. 94

18 KEYS TO MAINTENANCE COST CONTROL . . . . . p. 106

THE MAGAZINE OF PLANT OPERATING MANAGEMENT

See How **LUNKENHEIMER** SPACE-SAVING NEEDLE VALVES *Cut Maintenance*

Precision machining . . . compact design . . . meticulous workmanship. You see them all in this unretouched photograph. And what you see means only one thing — quality — the kind of quality that keeps maintenance costs down.

The evidence is even easier to see when you compare the Lunkenheimer Needle Valve—part-for-part check for modern compact design—with any other valve you can buy. Let your Lunkenheimer Distributor show you what we mean.

Feature-for-feature, he will match the Lunkenheimer Needle Valve against any needle valve you have in stock. But don't buy on sight alone. Make an on-the-line comparison test. Let your maintenance savings prove why it pays to standardize on Lunkenheimer Needle Valves . . . or write The Lunkenheimer Company, Cincinnati 14, Ohio.

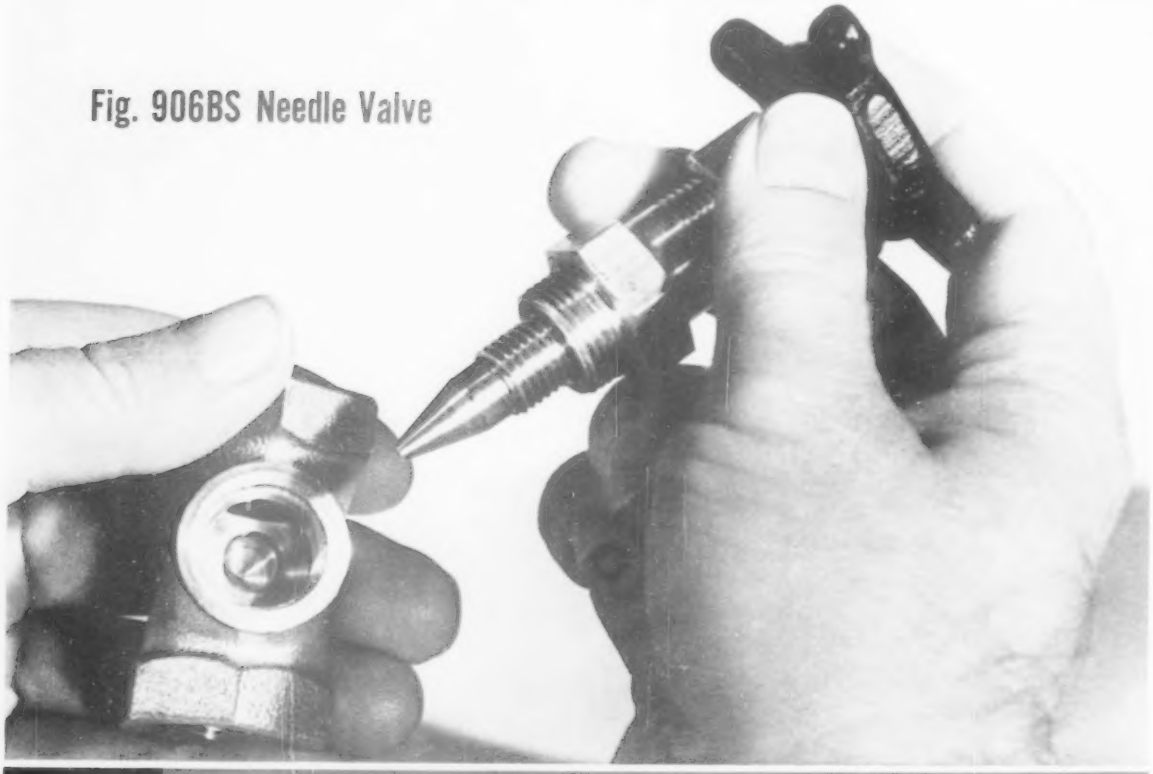


Fig. 906BS Needle Valve

LUNKENHEIMER QUALITY

LUNKENHEIMER®

THE ONE *Great* NAME IN VALVES

For more facts circle 446 on READER SERVICE CARD

B.F.Goodrich V belt briefs

TIPS ON THE CARE, MAINTENANCE AND SELECTION OF V BELTS FOR INDUSTRY

For longer belt life—keep sheaves aligned

Sheave misalignment is caused by shafts which aren't parallel or by bent shafts or wobbly sheaves. If shafts are not parallel, belts on one side are drawn tighter and pull more than their share of the load. As a result, these belts wear out faster, causing the entire set to be replaced before it has given maximum service. If misalignment is in the sheave only, the belt will enter and leave the grooves at an angle, causing excessive sheave wear.

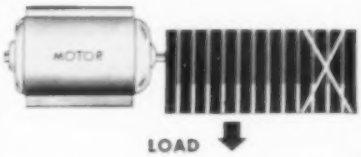
How to align sheaves: First make sure that shafts are parallel. Measure distance between shafts, both at outside of sheave and at inside. Parallel shafts will be the same distance apart at both points.

Next, tie a string to drive shaft (as shown in picture). If the sheaves are properly lined up, the string will touch them at the points indicated by arrow. By rotating each sheave through one-half revolution, you can also determine whether sheave is wobbly or drive shaft bent. If either of these conditions exists, the inner rim of the sheave will pull away from the string when the sheave is rotated.

A switch to high capacity belts can save you money

Most V belt drives are operated with belts made for standard horsepower ratings. But the use of belts with higher ratings (about 40% higher than standard) is growing. In most cases, fewer belts are needed when the higher rated belts are used, saving space and cost. Where drives have not worked satisfactorily, a switch to B.F.Goodrich high capacity belts often solves the problem.

More and more new equipment comes with the higher rated belts, so be sure to check whether standard or high capacity belts are required when ordering replacements. B.F.Goodrich high capacity belts are also oil resisting and static conducting.



Nine high capacity belts can do the work of 13.

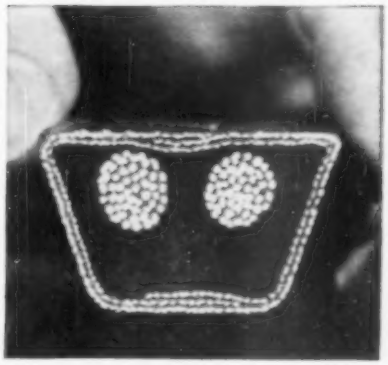
What caused this V belt failure?

Appearance: Cover fabric ruptured.

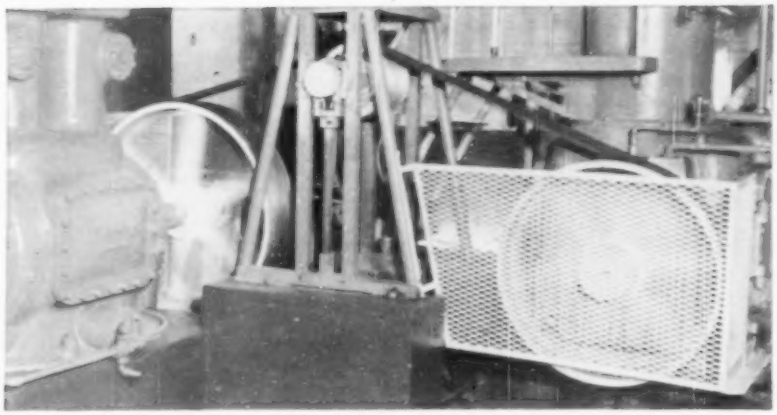
Cause: Belt pried over sheaves, or foreign object fell into grooves.

Prevention: Move motor toward driven sheave when replacing belts. Protect belt with cover.

Grommet belts more flexible, absorb shock, last longer



The Grommet V belt made by B.F.Goodrich is more flexible because it has its load-carrying cords concentrated in twin grommets. They are completely surrounded by tough, resilient cord-free rubber and bend easily, giving more uniform grip. There are no plies of fabric to stiffen belt and decrease ability to absorb shock. There is no splice, no stiff built-up section where cords overlap. This stronger, more resilient construction gives the B.F.Goodrich Grommet belt 20% to 50% longer life. Yet it costs no more than ordinary belts.



BELTS WERE WHIPPED TO DEATH—*The pulsating load of this compressor was whipping belts to pieces in no time. Many belts were tried; most lasted only three or four months, had to be taken up every day, none had ever lasted a year. Then B.F.Goodrich Grommet V belts were tried. That was 18 months ago. There's no sign of wear yet, and no takeup since the first day—not one moment of attention or service.*

Ask a factory-trained specialist

For help in selecting V belts for any kind of service, call the man who is a specialist in V belts—your B.F.Goodrich distributor. He can help you cut costs by getting longer life from your V belt drives. *B.F.Goodrich Industrial Products Company, Dept. M-311, Akron 18, Ohio.*

B.F.Goodrich V belts

For more facts circle 449 on Reader Service Card

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67TH YEAR OF PUBLICATION

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THE MAGAZINE OF PLANT OPERATING MANAGEMENT

Edited exclusively for the men with management responsibility for production and maintenance in the manufacturing industries

PROBLEM-SOLVING GUIDE

THIS SIMPLE FILING SYSTEM is designed to give quick access to past FACTORY articles that can help you solve current operating problems. Here's how it works:

1. All major articles and many short items are classified according to a functional code system (below). Codes cover basic operating responsibilities.

2. Where applicable, articles are also coded (see numbers in parentheses) to show secondary or closely related topics.

3. To use, cut up the items below. Paste them on 3x5-in. cards and file by code number. To cross-index, copy the information on a second card, and file by secondary code.

Note: For suggestions on using this new tool (plus an outline for a more complete decimal filing system), see FACTORY, February 1957, page 104.

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New ELPAR R-10 series fork truck.

Twice the Life . . . ⅓rd the Operating Costs

In buying power industrial trucks, look beyond initial costs—and you'll discover these overwhelming advantages of ELPAR electric trucks:

- ELPAR electric trucks last at least twice as long as gas trucks operating under comparable conditions. Thus, when *all* initial and replacement costs are added up, ELPAR trucks actually *cost less to buy.*
- ELPAR truck operating and maintenance costs are only one-third those of comparable gas models. Based on 2,000 hours of operation, this means an average saving in direct operating costs of over *$1,200 per truck per year.*

These facts are based upon actual case studies from a number of plants. They explain why 75 of the 100 largest U. S. corporations now are using ELPAR trucks . . . and why more and more companies are converting their fleets to ELPAR electrics.

Learn how ELPAR trucks can make short work of your toughest materials handling problems —with an almost unbelievably high bonus of savings . . .

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of the ELPAR *Lift,* "Gas vs. Electric Trucks."

ELPAR
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THE ELWELL-PARKER ELECTRIC COMPANY

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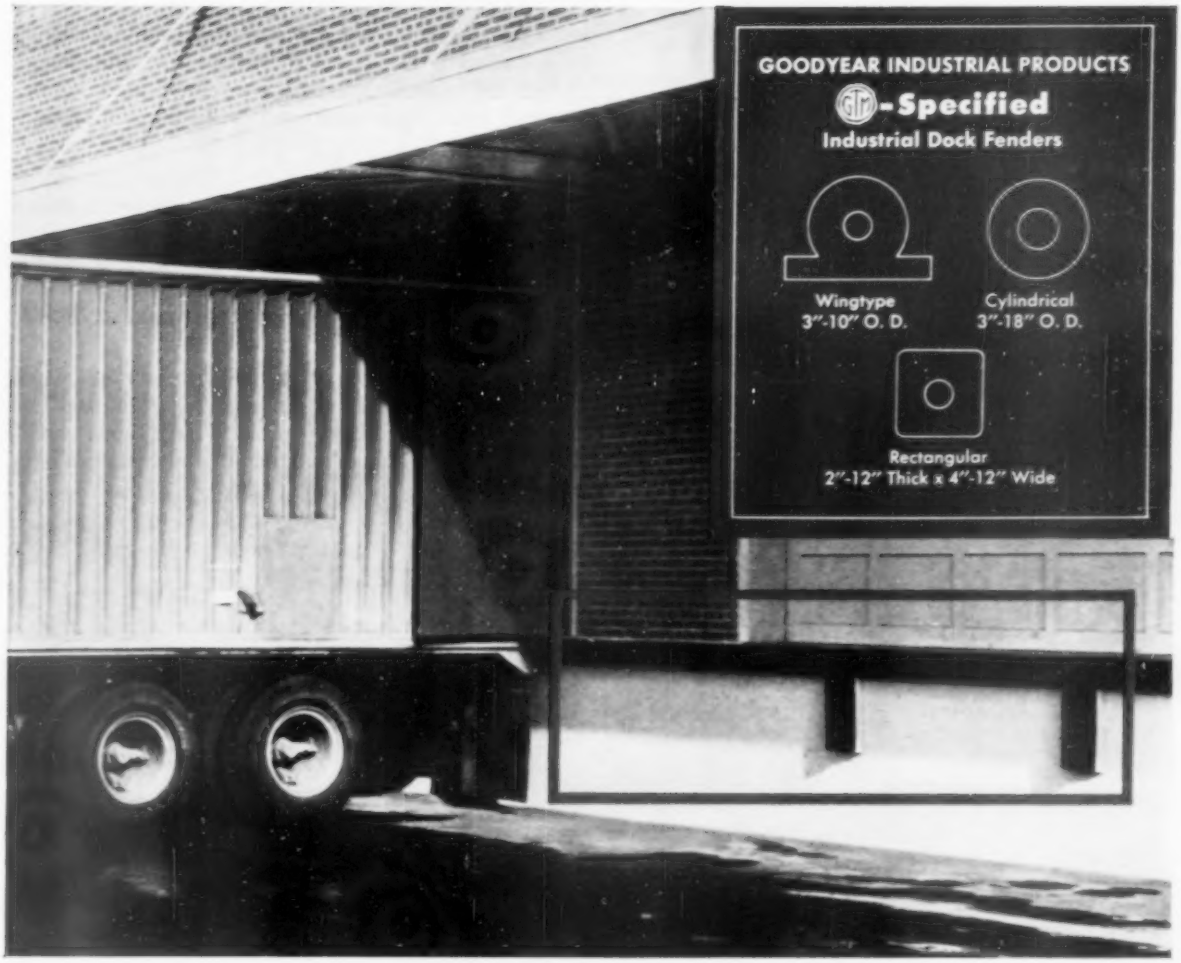
Twice the Life . . . ⅓rd the Operating Costs



How to unload an unloading expense

When 30 tons or more of loaded tractor-trailer smack into your loading dock—rig after rig, day after day—something's got to give. And you have to *keep* giving—just as long as repair bills for splintered, shattered dock edges and bent trailer doors pile up.

With many operators, though, these expenses are now a thing of the past. They're men who've taken the advice of the G.T.M.—Goodyear Technical Man—and installed Goodyear Dock Fenders along dock edges and other exposed spots. These husky, tremendously resilient rubber sections soak up the incessant battering that can damage dock and trucks alike.

Goodyear Dock Fenders are far more durable, too, than other types of shock absorbers. They defy constant crushing and abrasion. They're easily installed. They require little or no maintenance. In fact, the same type of fenders are gentling the berthing of giant ocean liners—*in some installations serving for 25 years without appreciable wear.*

Wouldn't it pay you, then, to look into this *proved* way of unloading some of your unloading expenses? The G.T.M. will be glad to furnish further facts and figures. Contact him through your Goodyear Distributor—or by writing:

Goodyear, Industrial Products Division
Akron 16, Ohio

DOCK FENDERS by

GOODYEAR

THE GREATEST NAME IN RUBBER

For more facts circle 451 on Reader Service Card

How a Johns-Manville Roof Survey helps . . .

STOP COSTLY ROOFING TROUBLES

Don't take your roof for granted, even though it doesn't seem to be leaking. Winter weather often opens up laps in the roofing, cracks the parapet and coping. Ice and snow can wear and weaken roofing felts and flashings.

To correct roofing defects before they result in costly damage, it pays to have your roof inspected every spring by an expert. Your J-M Roofing Contractor is the man to do it. He will make a complete survey covering all critical areas of the roof. This includes flashings, deck, roofing felts, parapet walls, skylights, ventilators, etc.

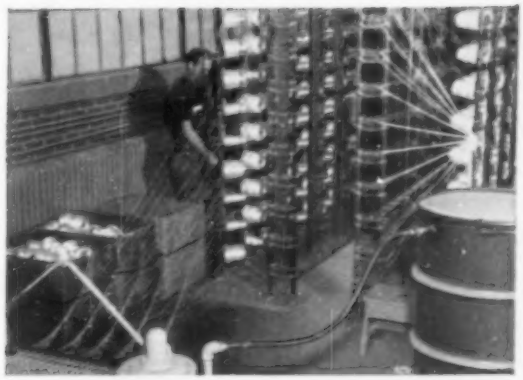
This detailed survey is made without obligation. A written report will tell you what defects need immediate attention. This report also points out conditions which should be corrected now to eliminate future trouble.

For free Roof Survey, call your J-M Roofing Contractor. He is listed in the Classified Telephone Directory.

Send today for a copy of booklet "Things You Should Know About Your Roof." It contains information about the J-M Roof Survey Plan. Write: Johns-Manville, Box 158, New York 16, N. Y. In Canada, write 565 Lakeshore Road East, Port Credit, Ont.

JOHNS-MANVILLE JOHNS-MANVILLE JM PRODUCTS

How V-Belts with the Green Seal save you money



Moneysaving performance is built into every Goodyear V-Belt in exclusive manufacturing processes like those illustrated above. Synthetic fiber cords are impregnated repeatedly with special rubber latex compounds. When treated at a precise tension and temperature for a precise time (the exclusive 3-T process), the cords are stabilized at the point of greatest strength before being built into the load-carrying section of Goodyear V-Belts.

They're dimensionally stable – Exclusive 3-T Cords or unsurpassed steel cables muscle belts that don't shrink or stretch in storage. So matched sets *stay* matched. Down time is cut to a new low.

They're precisely measured – The length you need is the length you get. Mismatching failures are minimized.

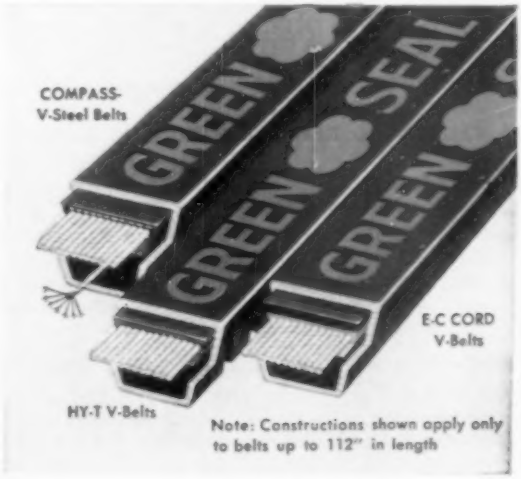
They're high in modulus, low in stretch – Power loss through "creep" is virtually eliminated. Take-ups are few and far between.

They're friction-balanced, non-dusting – Their covers don't grab or stick in the grooves. They run smoothly and cleanly.

They're mildew-inhibited – They're safely stored and operated in high moisture. Stand-by drives always ready when needed.

—AND IT ALL ADDS UP TO

—Maximum trouble-free horsepower hours at minimum cost. It's reason aplenty that you should use only V-Belts with the Green Seal. See your Goodyear Distributor for details. Or write Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.



DIMENSIONALLY STABLE V-BELTS with the GREEN SEAL by

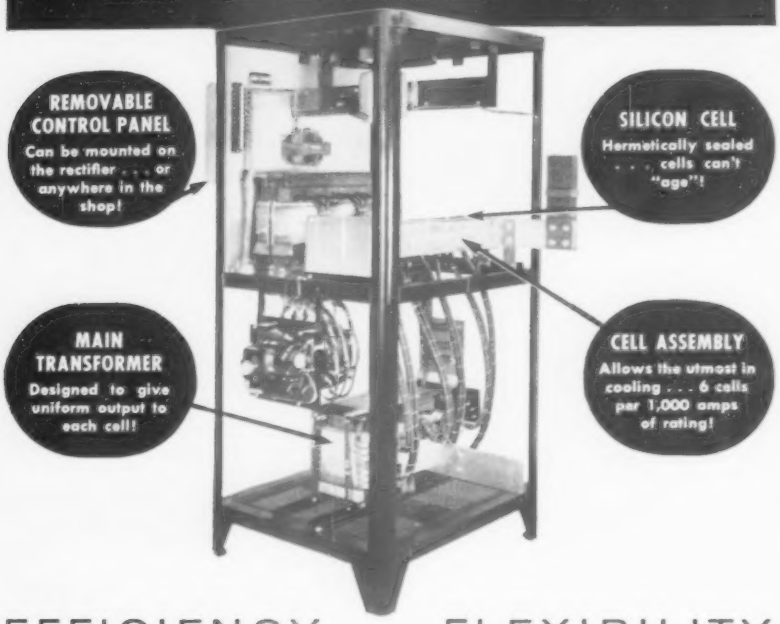
GOODYEAR

THE GREATEST NAME IN RUBBER

Compass, E-C Cord, Hy-T, Green Seal—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

For more facts circle 453 on Reader Service Card

NEW from UDYLITE
UDYSIL
THE SILICON RECTIFIER with BALANCED POWER



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All these exclusive advantages are yours when you select a UDYSIL rectifier.

Available in 1,000, 2,000, 3,000, 4,000, 5,000 and 6,000 ampere ratings with a wide selection of voltages, Udysil rectifiers represent the ultimate in performance, long life and dependability. For the "inside" story on the UDYSIL Line and what it can do for you, contact your local UDYLITE representative today, or write direct to:

the udylite corporation

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FACTORY LETTERS

STILL IN DEMAND

Sir:

Recently I discovered an article on Automation in an old copy of FACTORY. If this article, "What Automation Means to America," September 1955, is still available, I would like to obtain a copy.

Also, could I obtain a list of articles that have appeared in your magazine in the last five years?

John W. Marshall
P. Eng., Lecturer in Management
Ryerson Institute of Technology
50 Gould St., Toronto 2, Ont.

►It is still available at 35c. Lists of all current reprints are free. Just ask for one. Write to Reader Service Dept., FACTORY, 330 West 42nd St., N. Y. 36.—ED.

MORE "OPINION"

Sir:

Your editorial in the February issue entitled "Hysteria Over Educational Standards," is an excellent one. Your point that we can meet Russia's scientific and technical advances without regimentation and dictation is a fundamental point which most other writers on this subject seem to be overlooking.

I agree that we can do more along the lines of the National Merit Scholarship program without risking federal control over education; however, we must be careful that in

Turn the page

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APRIL 1958 Vol. 116, No. 4

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Have you fully explored the possibilities of your Inner Space—the vertical space from basement to roof?

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All Lamson systems are engineered, built and installed by Lamson—no split responsibility. All are guaranteed to perform as specified.

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LAMSON

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Manufacturers of Pneumatic Airtube* Systems • Integrated Conveying Systems • Pallet Loaders • Selective Vertical Conveyors • Bookveyors* • Clinical History Lifts • Trayveyors® • Food Service Systems • Erecto* Conveyors • Blowers and Exhausters • Exidust® Central Vacuum Cleaning Systems • Dryset® Air Vacuum Systems • Mobilift® Industrial Trucks

*Trade Name

For more facts circle 455 on Reader Service Card

for Fireproof Construction,
Design with...

BESTWALL®
FIRESTOPPER
ROOF DECK

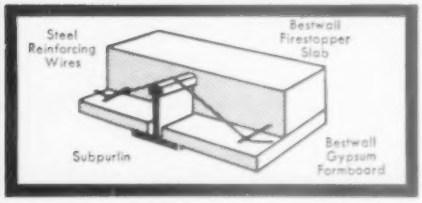
FIRESAFETY—The roof deck that combines fire resistance with strength! Steel subpurlins welded to the main steel structure; permanent base of Bestwall Gypsum Formboard; reinforced steel mesh; and poured-in-place Bestwall Metro-Mix gypsum cement.

FLEXIBILITY—It's light—for savings in structural supports! It's strong—meets all building requirements! It's adaptable—for use on any shaped roof!

ECONOMY—An average crew can pour 30,000 sq. ft. in one day! And the Metro-Mix slab sets in less than an hour so final built-up roofing can be applied immediately.

DURABILITY—Long years of efficient, protective service—low maintenance cost.

These are some of the many reasons why so many Plant Managers and Maintenance Engineers choose Bestwall Firestopper Roof Deck.



Bestwall Certain-teed Sales Corp., Dept. F
120 E. Lancaster Ave.
Armore, Pa.
Please send me more information on Bestwall Firestopper Roof Deck.
Name.....Title.....
Company.....
Street.....
City.....Zone....State.....

FIREPROOF GYPSUM
BESTWALL®
BUILDING PRODUCTS

Manufactured by Bestwall Gypsum Company—sold through
BESTWALL CERTAIN-TEED SALES CORPORATION
120 East Lancaster Avenue, Ardmore, Pa.
EXPORT DEPARTMENT: 100 East 42nd St., New York 17, N.Y.

SALES OFFICES:
ATLANTA, GA. BUFFALO, N. Y. CHICAGO, ILL. CHICAGO HTS., ILL. CLEVELAND, OHIO DALLAS, TEXAS DES MOINES, IOWA DETROIT, MICH. EAST ST. LOUIS, ILL. JACKSON, MISS. KANSAS CITY, MO. MINNEAPOLIS, MINN. WILMINGTON, DEL. RICHMOND, CALIF. SALT LAKE CITY, UTAH TACOMA, WASH.

FACTORY / LETTERS

Begins on page 8

enlarging any federal educational program we do not gradually allow the federal government to take on the very dictation and regimentation of education which we dislike. It's nice to see such a down-to-earth opinion on this problem.

W. W. Beyer
Plant Manager
Economics Laboratory, Inc.
Guardian Bldg., St. Paul, Minn.

ONE LIKES THE STORY. . .

Sir:

We were quite interested in the equipment for the automatic heating and feeding of fiber strips mentioned on p. 88 of your February issue (article, "Blitzing Costs With Bright Ideas"). We are wondering how we might obtain additional information as to the construction or purchase of this equipment.

C. M. Metelski
President
Wolverine Fabricating & Mfg. Co.
Princess St. & M.C.R.R.
Inkster, Mich.

►We are forwarding a copy of your letter to Mr. Mason B. Lindsey, Chief Engineer, Standards, National Vulcanized Fibre Co., Wilmington 99, Del. We're sure he will send you the name of the manufacturer of the equipment—ED.

. . . ANOTHER IS NOT SURE

Sir:

In the article "Blitzing Costs With Bright Ideas," February 1958, p. 84, are two photographs, both in violation of the standards of motion and timestudy principles. The illustration "Parts whiz through via chuted trucks" has the operator making unnecessary body turns which tend to tire the operator and lower his efficiency. The incoming material should be located on one cart and the finished material on another. Also, the unfinished parts and the chute for the finished parts should be nearer the operator.

In "Automated device doubles brake output," the operator has to perform body side bends both to

For more facts circle 456 on Reader Service Card

Newly designed
Type H Motor Control

Ultimate in protection

for men and machines

Here's the last word in control protection for personnel and equipment! It's all part of Allis-Chalmers newly designed, high voltage control.

And maximum protection is only one of the features of this new control line. You also get full-front access, smaller cabinet size (2.36 square feet less than competitive units), a completely tested unit, and ample panel space for optional features.

1. Gang-operated disconnect switch isolates starter from incoming power—assures safe entry to high voltage compartments.

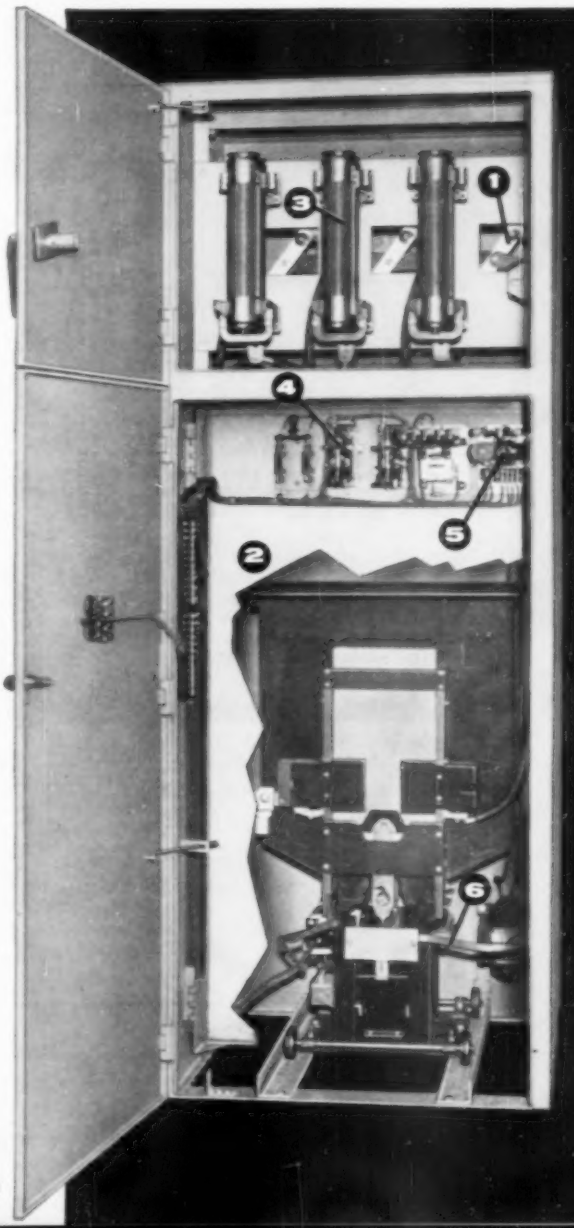
2. Steel cubicle separates high and low voltage equipment.

3. Short-circuit protection provided by fast-acting current-limiting fuses, rated 150,000 kva at 2300 volts and 250,000 kva at 4160 or 4600 volts.

4. Overload protection provided by accurate temperature-compensated thermal overload relays which trip only with excessive motor current, preventing needless motor stoppages.

5. Undervoltage protection instantaneously opens line contactor on loss of voltage. Time-delay undervoltage protection also available.

6. Mechanical interlock coordinates contactor, disconnect switch, outer door and inner control barrier for maximum safety.



This starter line meets every 2300 to 5000-volt motor need. Contact your A-C office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

ALLIS-CHALMERS

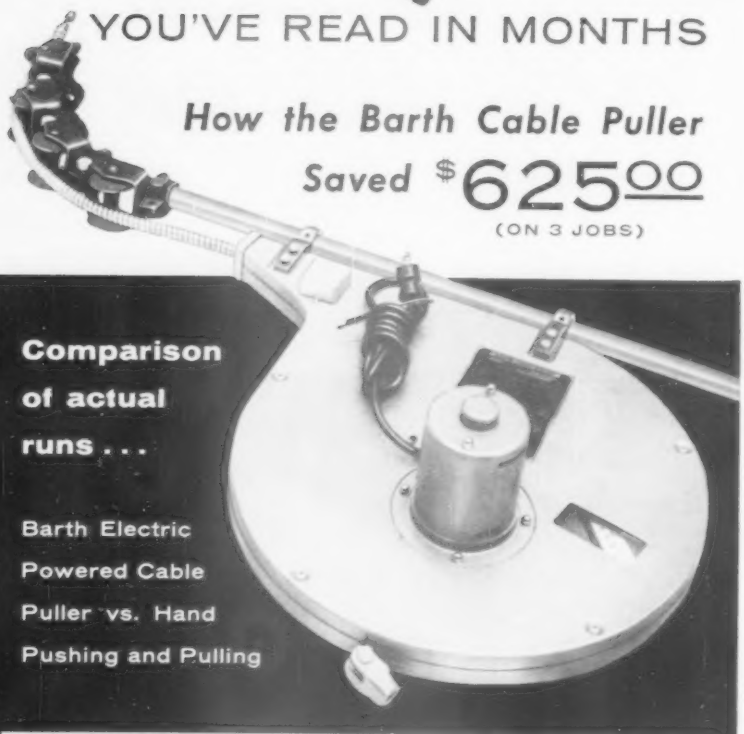
For more facts circle 457 on Reader Service Card

A-5521

THE MOST IMPORTANT

Business Information

YOU'VE READ IN MONTHS



How the Barth Cable Puller Saved $625.00
(ON 3 JOBS)

Comparison of actual runs . . .

Barth Electric Powered Cable Puller vs. Hand Pushing and Pulling

DESCRIPTION OF ACTUAL RUNS PULLED	Est. Hand Pulling	BARTH Cable Puller	Savings at $5.00 Per Hour
3 - 500 — 90 Feet in 3" Pipe — 2 Ells — 15' Rise 3 - 3/0 — 100 Feet in 2" Pipe — 2 Ells — 15' Rise 3 - 3/0 — 50 Feet in 2" Pipe — 1 Ell — 1 Offset	30 Man Hours	10 Man Hours	$100.00
3 - 500 — 120 Feet in 3" Pipe — 2 Ells — 10' Rise 3 - 500 — 80 Feet in 3" Pipe — 2 Ells — 10' Rise 3 - 4/0 — 160 Feet in 2" Pipe — 2 Ells — 10' Rise	60 Man Hours	10 Man Hours	$250.00
3 - 1/0 — 140 Feet in 2" Pipe — 2 Ells — 1 Offset 4 - 3/0 — 140 Feet in 2½" Pipe — 2 Ells — 1 Offset Plus nine other similar runs	85 Man Hours	30 Man Hours	$275.00

YOU CAN SAVE MONEY—TIME—ENERGY

—only the Barth Cable Puller pushes tape and pulls wire electrically!

THE BARTH CORPORATION 12655 Brookpark Road • Cleveland 30, Ohio

Please send the complete Cable Puller Data Folder and prices.

NAME_____ YOUR COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

Begins on page 8

obtain the unfinished part and to release the finished material. The unfinished part should be located within arm reach, with no bends involved, and the finished part could be chuted to a finish container.

H. A. Gilliard
Management Analyst (Public Works)
U. S. Naval Air Station
Sanford, Fla.

►We won't argue with you because we're not in a position to know all the facts related to these operations. However, we are forwarding your letter to the author. We only wish more readers would participate as you have. It helps accomplish our objective—to aid plant operating management with its job—ED.

NIGHT SHIFT COSTS

Sir:

We have a very small night shift and are contemplating expansion. Before this move is made we would like to check all phases of day shift versus night shift operation. Could you tell us if there are any formulas for evaluating such a move.

John H. Handley
Assistant Works Manager
Willcox & Gibbs Sewing Mach. Co.
Nyack, N. Y.

►We know of no specific formula for comparing costs of day and night shift operation. Can any of our readers help?—ED.

INFORMATION WANTED

Sir:

In the December 1957 issue of FACTORY (p. 248) there was an article on ion exchange with Inter-Act. Will you please give us the address of the manufacturer?

V. Plesscher
Editorial Director
The National Research Bureau, Inc.
415 N. Dearborn St., Chicago 10

►Address of the manufacturer is Intertectics, Inc., Northfield & Forbes Roads, Bedford, Ohio—ED.

Turn the page

For more facts circle 458 on Reader Service Card

INTRODUCING THE OUTSTANDING NEW

ADVANCE

Convertamatic 24

FLOOR MACHINE

The most versatile high-speed automatic floor machine for scrubbing and dry-cleaning on the market today!

20 TIMES FASTER THAN OLD-FASHIONED CLEANING . . .

For high-speed floor maintenance in schools, hospitals, industrial plants, offices, public buildings.

Look how this versatile new machine speeds up both wet and dry floor maintenance operations!

Cleans 12,500 square feet per hour

FOR WET CLEANING
In a single pass . . . 1. Lays scrubbing solution. 2. Scrubs thoroughly. 3. Picks up dirt and solution. 4. Damp-dries floor.

FOR DRY CLEANING
In a single pass . . . 1. Polishes or steel-wools. 2. Picks up all dust and loose material—leaving floor bright, clean and dust-free.

Plus this outstanding feature . . . a complete, portable wet-dry industrial vacuum.

The "Convertamatic" provides you with an easily removable industrial vac. Doubles the utility of your machine! Takes less than 30 seconds to remove or replace!

ADDITIONAL PERFORMANCE FEATURES

- Exclusive new "Powerflo" drive. No troublesome clutch or differential. Provides fully variable speeds forward and reverse—from slowest walk for intensive scrubbing, to a fast walk for high speed cleaning of slightly soiled areas.
- Twin brushes cut big 24" swath.
- 12 gallon solution tank—choice of 12 or 16 gal. recovery tank. Easy to fill—easy to empty.
- Short wheel base for easy maneuverability.
- Powerful by-pass "Silent-Power" wet-dry vac system.
- Fingertip controls for all operations including squeegee.
- Double-bladed suction squeegee.
- Variable pressure on brushes—from 0 to 150 pounds.

GASOLINE—PROPANE—ELECTRIC

FINANCE & LEASE PLANS AVAILABLE

Write for details today

ADVANCE

ADVANCE FLOOR MACHINE CO.
4102 AB Washington Avenue North
Minneapolis 12, Minnesota

For more facts circle 459 on Reader Service Card

NØELTING

Faultless Casters

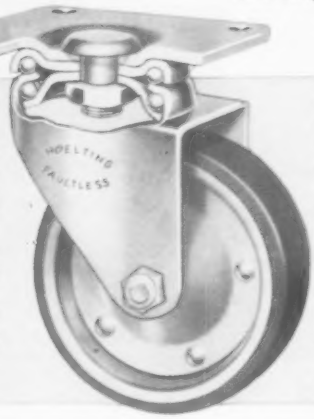
move −306° Liquid Nitrogen Safely!

General Electric Semi-Conductor Plant, Buffalo, selected Series 1100 and 1700 Casters for the extremely critical job of moving −306° liquid nitrogen *in and out* of doors. Vacuum containers holding liquid gas remain on Faultless Castered trucks continuously for swift, sure delivery to the exact spot when needed. Because of the extremely low temperature of the gas, safety is important. Contact with the skin would cause a severe burn.

Easy rolling, easy swiveling Faultless Casters assure shock-free movement—dangerous manual handling is avoided. Another way in which Faultless Casters increase materials handling efficiency for men in industry.

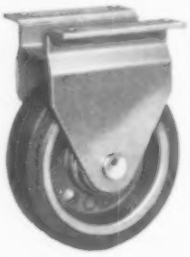
Faultless Casters

CUT YOUR HANDLING COSTS, AND MOVE ALL LOADS QUICKER, SAFER



Series 1100 Double Ball Bearing Swivel Faultless Casters have 2 large-dia. hardened raceways and 2 full rows of hardened, ground ball bearings for maximum swiveling ease. The top and lower ball retainers and horn are formed of heavy gauge steel. Renewable Rubber Tired Wheels operate quietly and efficiently.

Series 1700 Rigid Plate Casters feature an exceptionally strong horn construction and are available with wheel types and sizes, load ratings and overall heights to match Companion Series 1100 Swivel Plate Casters.



ASK YOUR DISTRIBUTOR!

Your Faultless Industrial Distributor will be glad to serve as your expert on casters and wheels. He stocks Faultless Casters and is prepared to offer "plus value" by recommending the right type, load capacity and wheels to suit your requirements. He is listed in your phone directory under "Casters."

Write for FREE Condensed 20-page Caster Catalog.

Faultless Caster Corporation
Evansville 7, Indiana

Send copy of condensed 20-page Caster Catalog, 157-G

Name _____
Firm _____
Address _____
City _____ State _____

FACTORY / LETTERS

Begins on page 8

Sir:

On p. 116 of your December 1957 Case Book you described a system of handling pallets called Glide-Aire. I would be very interested in having further information on this unique development.

Nathaniel Warshaw
Manager, Materials Handling
Research and Development
The American Pulley Co.
4200 Wissahickon Ave.
Philadelphia 29

►We suggest you contact either Mr. J. L. Jones, General Manager, or Mr. C. R. Strang, chief engineer, at the Tulsa Division of Douglas Aircraft Co.—ED.

Sir:

In your February 1957 issue, p. 84, in the article "Reinforced Plastics," you showed a photo of plastic pallets. Can you supply me with the names of the producers?

L. R. Taylor
Manager, Industrial Engineering
Ludlow Manufacturing & Sales Co.
P.O. Box 149, Indianola, Mass.

►The information about the plastic pallets came from the Bakelite Co. They tell us the molder is Firmaline Products, Inc., 9 Pierce Ave., Midland Park, N. J.—ED.

ADDRESS WANTED

Sir:

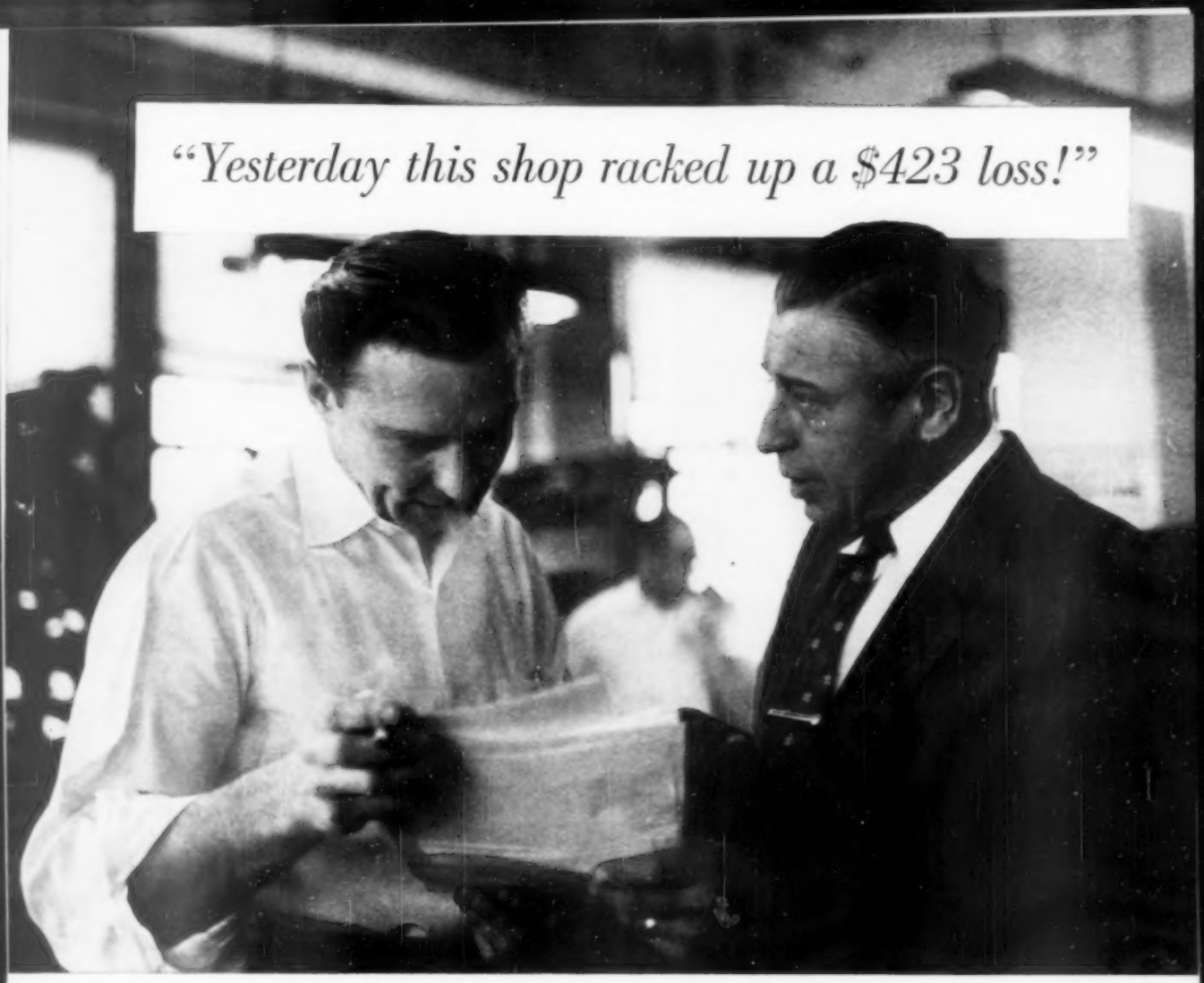
We have noticed the article "Big Savings from Two-Level Assembly" on p. 126 of FACTORY's December 1957 Case Book.

We would like to receive the address of the Colson Corp. because we are interested in obtaining more information on the special electric hydraulic lift.

A. K. Openchowski
Industrial Engineering Manager
Wright Aeronautical Div.
Curtiss-Wright Corp.
Wood-Ridge, N. J.

►Contact Mr. Ray Stahl, General Manager, Special Products Div., Colson Corp., 440 Somerville Ave., Somerville, Mass.—ED.

For more facts circle 460 on Reader Service Card



The foreman's bewildered. How can the plant manager be so sure? Even in a small shop like this one, you don't get *that* kind of information in 24 hours!

The plant manager never thought so, either. Today he knows different. He's got yesterday's down-time figures right in front of him. There's a loss all right. But he knows where – and why. And most important, he knows now that he's equipped to prevent its happening again.

How did the plant manager get such fast, reliable information? With the Keysort Plant Control Plan. Instead of the late or inadequate reports he *used* to get, PCP now gives him an accurate breakdown of each day's labor costs *by the following afternoon*. Keeping abreast of things almost as they happen, he can correct money-losing situations *in time* . . . can keep production flowing on a profitable level.

With just five fast, accurate Keysort PCP reports—1 daily, 2 weekly, 2 monthly—you can obtain complete modern management control of your business and your profits. At remarkably low cost.

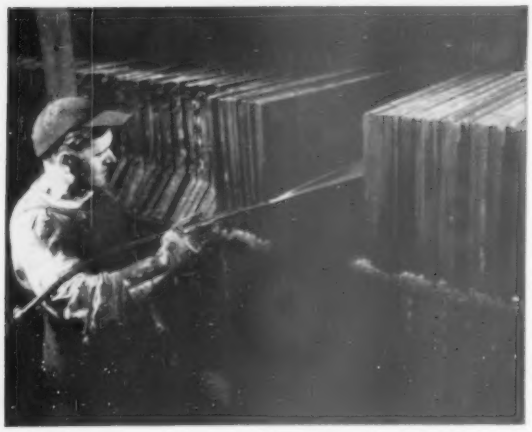
The nearby McBee man has a presentation which will show you how it's done. Phone him, or write us for illustrated folder containing an example of each report.

McBEE KEYSORT®

PUNCHED-CARD CONTROLS FOR ANY BUSINESS

ROYAL McBEE Corporation PORT CHESTER, N. Y., Offices in principal cities. In Canada: The McBee Company, Ltd., Toronto 16

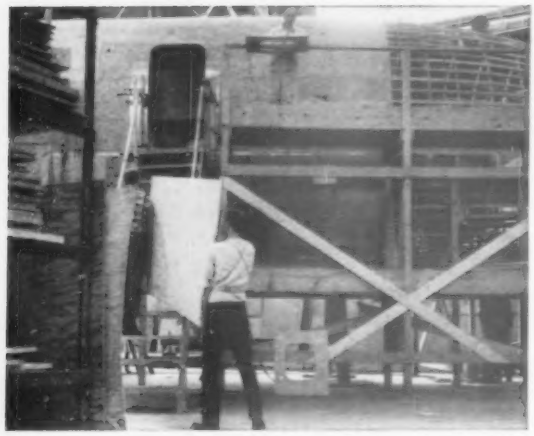
For more facts circle 461 on Reader Service Card



DURABLE

Exterior plywood filter frames last longer, cost less

One piece fir plywood filter frames used with electrolytic fluids in powdered metal production cost 40 per cent less than conventional lumber frames. Frames, shown here being cleaned, cut fabrication time and costs and also eliminate joints and fastenings which might work loose. Plywood prevents frames from racking out of shape. Despite the fact that they weigh much less and take up only half as much room as the bulkier lumber frames (shown at left), they stand up longer under constant immersion in the highly acid solutions used in the electrolytic process.



WORKABLE

Fir plywood simplifies complex aircraft mock-ups

Fir plywood is the basic raw material used in this full-size mock-up of Douglas Aircraft Company's giant DC-8 jet transport. Over 180 feet long, this plywood prototype permits engineers to make most efficient placement of components. Cross-laminated for two-way strength, plywood is easy to cut to intricate shapes, machines to tight tolerances and bends easily to required curvatures. Panels are light, cover big areas fast. Moving gears, control panels, wheels and other parts in addition to fuselage skin are mocked up in plywood.

LOW COST

Plywood templates help Ryan cut fabrication costs

Ryan Aeronautical Co., San Diego, saves hundreds of dollars each month by an ingenious use of fir plywood templates for photographic layouts. Actual size plywood shapes of parts to be obtained from metal sheets are arranged to determine optimum cutting layouts. Pictures are taken with a polaroid camera and data is given to production crews within minutes after the layout is approved. Aside from being faster and more accurate, use of these low cost plywood templates has cut Ryan's output of scrap by about 25 per cent. Templates also help fair plaster mock ups and are used for routing tool components during cutting operations.

FIR PLYWOOD

DFPA® TESTED QUALITY

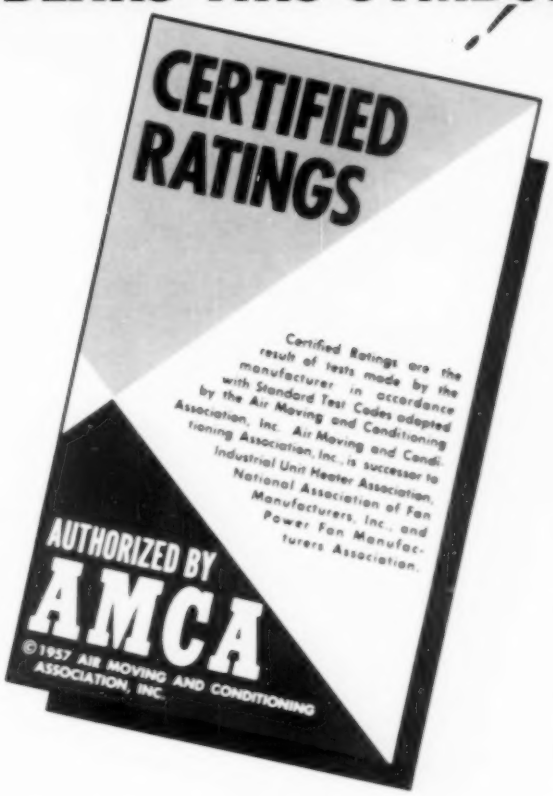
Letters DFPA on panel back or edge attest manufacture and inspection under industry-wide quality control program. Individual grade-trademarks are specification guides to the right type and grade and the *right* quality.

FOR INFORMATION about specific plywood uses, or for basic specification-use data, write (USA only) Douglas Fir Plywood Association, Dept. 175, Tacoma 2, Washington.

For more facts circle 462 on Reader Service Card

For more facts circle 463 on Reader Service Card ➤

BE SURE THAT THE STANDARD CATALOGUED AIR MOVING EQUIPMENT YOU SPECIFY OR USE BEARS THIS SYMBOL



It is your best assurance of properly rated air moving equipment

Every possible precaution to protect you against incorrect or improper performance ratings has been provided for in the Certified Rating Program of the Air Moving and Conditioning Association.

As a result, you can rely on published performance data of centrifugal, axial, and propeller fans, and power roof ventilators which carry the AMCA Certified Rating Seal.

HERE'S HOW AMCA CERTIFIED RATINGS PROTECT YOU

All Tests Must Be Made in AMCA Qualified Laboratories

To qualify for AMCA Certified Ratings, products must be tested in a laboratory approved by AMCA after careful inspection of test equipment, procedure, and personnel.

All Ratings Determined by Uniform Test Code

Manufacturers' published performance ratings for AMCA certified products must be the result of tests and permitted calculations made according to the AMCA Standard Test Code.

Protection Against Misuse of the Certified Rating

The Certified Rating Seal is the property of AMCA. The right to use it may be withdrawn for any violation of the license agreement between AMCA and the manufacturer.

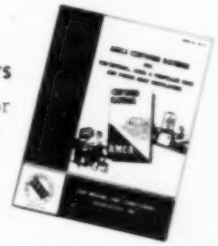
Additional safeguards provide for check of manufacturers' published performance ratings; and for periodic inspection of qualified test laboratories.

Manufacturers Qualified for AMCA Certified Ratings

The leading U.S. and Canadian manufacturers of air moving equipment are participating in this program. While space limitations do not permit a complete listing here, this information is available upon request to AMCA.

Product Specifiers

Write for Bulletin 153-57



Product Users

Write for Bulletin 152-57

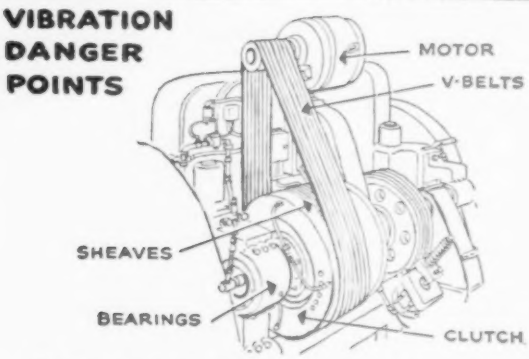
FOR YOUR OWN PROTECTION, SPECIFY "ACCORDING TO AMCA CERTIFIED RATING" FOR STANDARD PRODUCTS COVERED IN THIS PROGRAM

LITHO IN U.S.A.

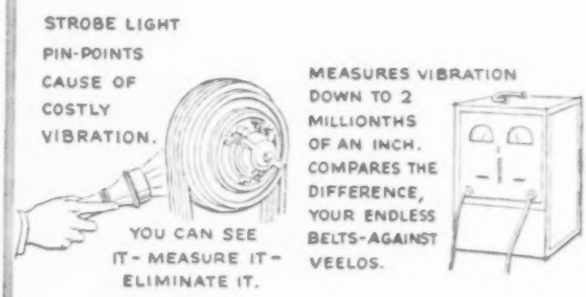
AIR MOVING & CONDITIONING ASSOCIATION, INC.

2159 GUARDIAN BUILDING DETROIT 26, MICHIGAN

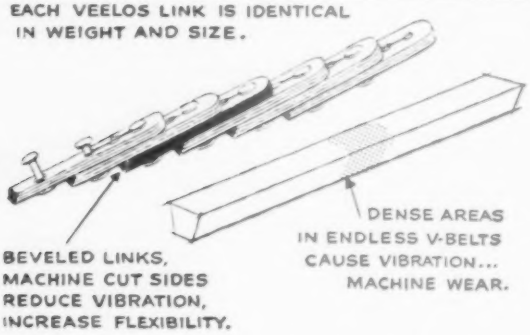
Here's Proof! Veelos Adjustable V-Belts Stop Costly Vibration in Your Drives



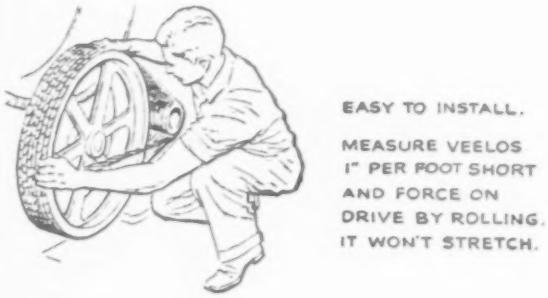
1. Watch out for these danger points. Machine vibration is caused by out-of-balance: in the motor, bearings, clutch, sheaves or V-belts. Often it is in the V-belts alone. This deadly vibration results in excessive machine wear, costly breakdown. But there's no need to guess or worry—your Manheim Veelos salesman can spot V-belt vibration in 15 minutes.



2. Veelos offers you electronic proof! Your Manheim Veelos salesman will prove that Veelos cuts V-belt vibration up to 89% *more* than any belts you're now using. This amazing vibration analysis pin-points the belt that has the "invisible shakes" . . . and tells you exactly how much money-costing vibration is present. You owe it to yourself and your company to see this Veelos V-belt test.

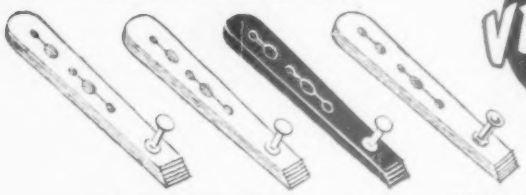


3. Install Veelos for smoother drives! Balanced construction of Veelos belts assures you faster, cleaner work, less rejects—less bearing wear. Each Veelos link and stud is identical in size and weight. As you know, endless belts have varying spots of density which cause excess vibration. This excess vibration increases chatter marks, machine wear and overall poor production output.



4. Veelos won't stretch any more than any other V-belt, when correctly installed on properly belted drives. Remember to follow the simple instructions on every reel—measure Veelos 1" per foot short of pitch length and roll on drive as tightly as possible. When installed this way, tension may *seem* excessive. However, this initial tension drops to normal when drive begins to run.

4 TYPES FOR ALL DRIVES



REGULAR For general service

OIL PROOF For oily and hot drives

COATED For wet or oily drives

STATIC-CONDUCTING (with non-ferrous studs) For explosive atmosphere, oily and hot drives

For all sizes and types of drives. Double-V available for serpentine drives.

VEELOS® THE BALANCED LINK V-BELT

Known as Veelink outside U.S.A.

MANHEIM

451 Qualified Distributors

Write for free Veelos Data Book or Veelos Vibration Demonstration to: Manheim Mfg. & Belting Co. 803 Stiegel St., Manheim, Pa.

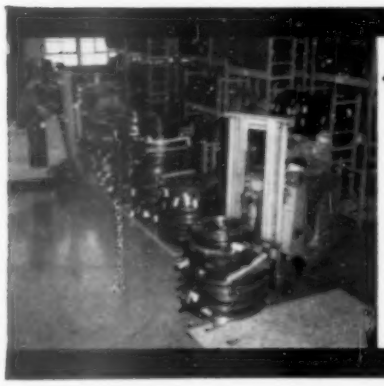
"Industrial Belt Specialists since 1911"

©M. M. & B. Co. 1957

For more facts circle 464 on Reader Service Card

Whatever you handle — do it better the L-S way...

PAPER A New York lithographer turns to L-S electrics, free from dangerous fuel and fumes, for safe quick routing of tons of paper and paperboard daily. For complete information, check Case History #276-1 on coupon below.



COILS A Michigan manufacturer reports increased handling efficiency plus a warehouse space saving of 4500 square feet — thanks to L-S electrics. Check Case History #349-1 on coupon below.

HOUSEWARES A Detroit warehouse finds the ideal balance of electric and hand-operated equipment in L-S Products for the speedy handling of assorted odd-shaped goods. Check Case History #507-1 for further details.

Experienced L-S representatives and the complete job-tailored line of L-S materials handling equipment can provide a better answer to any handling problem.

The COMPLETE Line of Materials Handling Equipment

The "MASTER" Line **LS LEWIS-SHEPARD®**

LEWIS-SHEPARD PRODUCTS, INC. • 154 Walnut Street • Watertown 72, Massachusetts

Please send me the following Case Histories showing how LEWIS-SHEPARD saved dollars by the economical handling of

☐ PAPER (#276-1) ☐ COILS (#349-1) ☐ HOUSEWARES (#507-1)

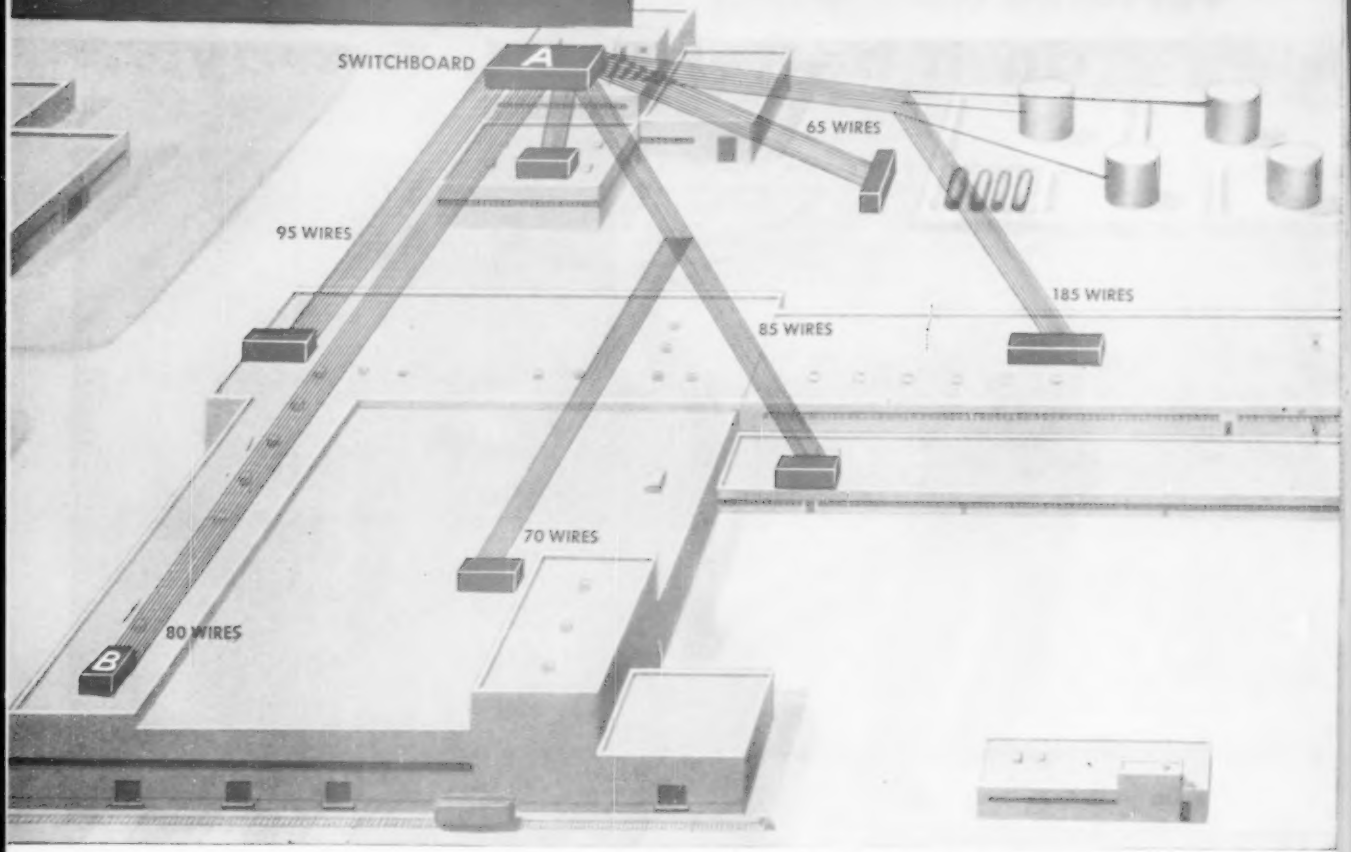
NAME..... TITLE.....

COMPANY..... CITY..... ZONE..... STATE.....

◄ For more facts circle 464 on Reader Service Card

For more facts circle 465 on Reader Service Card

SUPERVISORY CONTROL

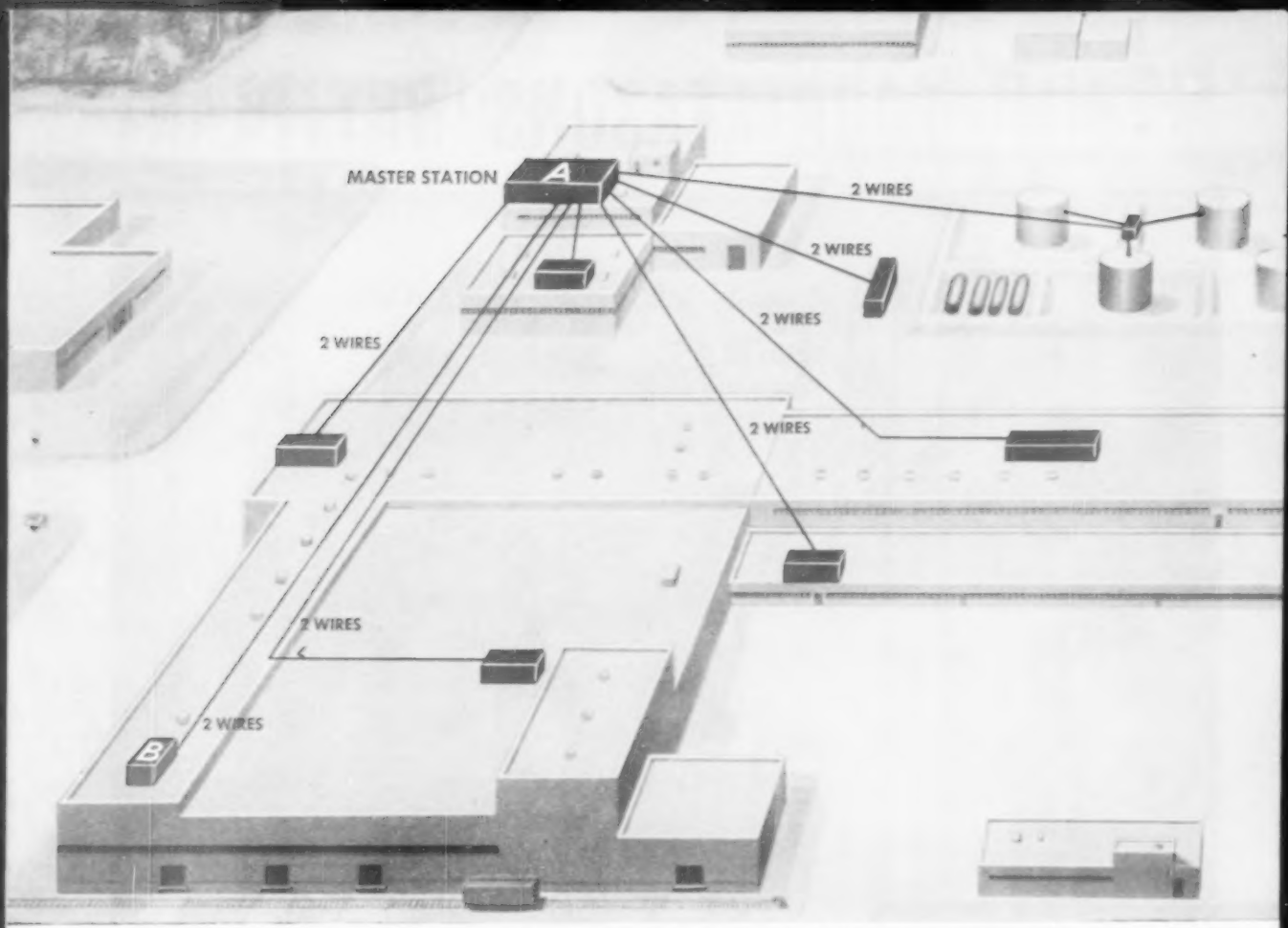


DIRECT WIRE usually requires installation of at least five wires between switchboard (A) and each piece of controlled equipment. Load center (B), containing 16 circuit breakers, would need 80 wires, probably more.

SPACE-SAVING SUPERVISORY remote station equipment is installed in switchgear line-up with the magne-blast air circuit breakers it controls in East Coast refinery.

MASTER STATION equipment in this mid-west water company's booster station controls pumps, valves and circuit breakers.

For more facts circle 466 on Reader Service Card



SUPERVISORY centralizes control with only one pair of wires between master station (A) and remote station (B) located at controlled load center. Fewer wires mean savings in material, installation and maintenance costs.

General Electric Supervisory Equipment costs less to install and operate than comparable direct-wire control systems

General Electric Supervisory Equipment centralizes the control of any piece of electrical apparatus which has provision for local control . . . and does it less expensively than comparable direct-wire systems.

With supervisory equipment, you install only one pair of wires between a master control station and a remote station located near the controlled equipment. One pair of wires controls from one to 128 pieces of equipment. With direct-wire, five wires must usually connect a switchboard with *each* piece of controlled apparatus.

Supervisory saves materials and installation costs, and reduces maintenance time, since fewer wires mean fewer trouble spots. For more information on how Supervisory Equipment saves money, call your nearest General Electric Apparatus Sales Office, or mail the coupon at right.

Progress Is Our Most Important Product

GENERAL ELECTRIC

SECTION B513-4
GENERAL ELECTRIC CO.
SCHENECTADY 5, N. Y.

I'd like full details on the economies of General Electric Supervisory Control Equipment. Please send me GEA-6603.

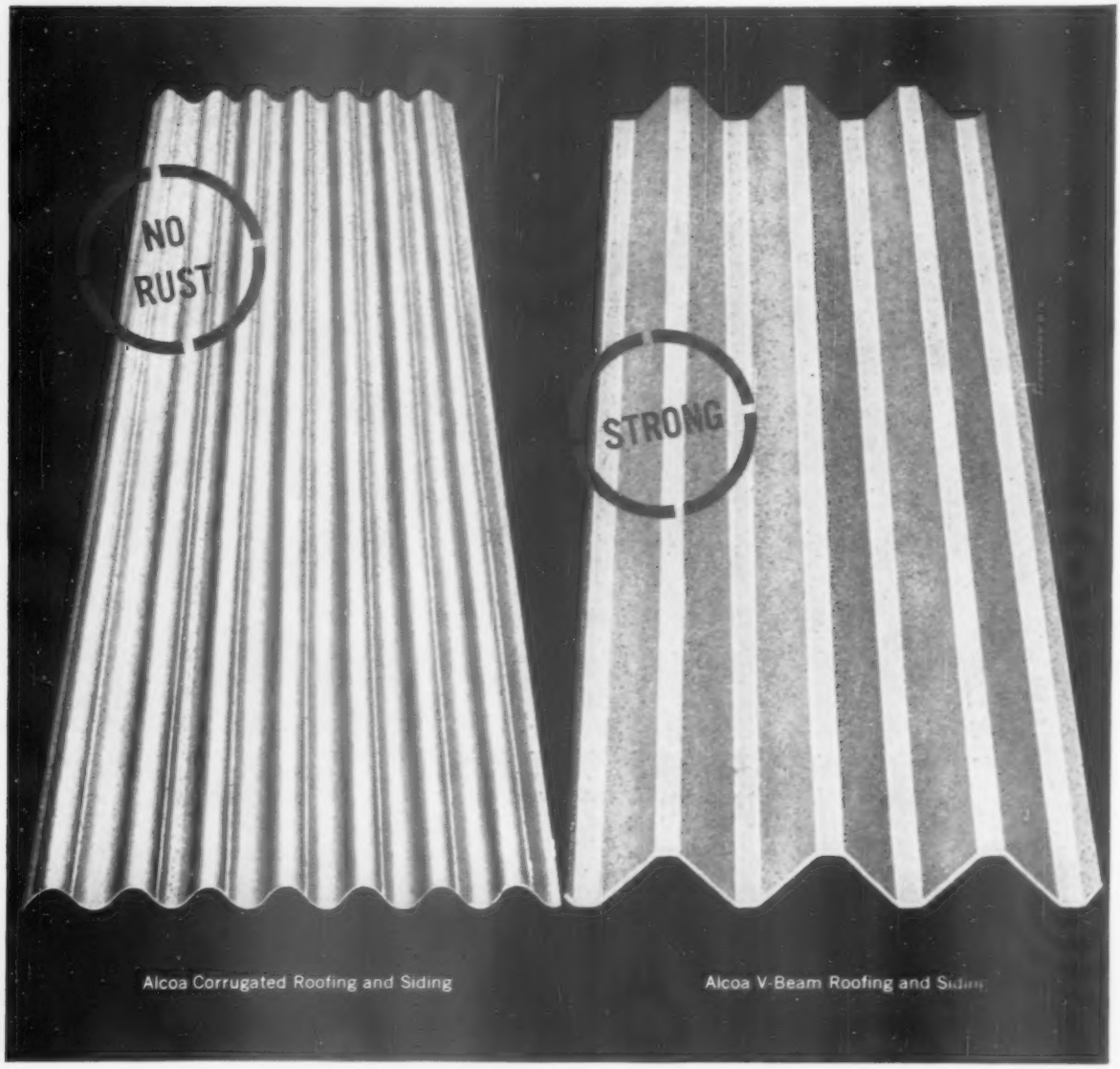
NAME .....

COMPANY .....

STREET .....

CITY ..... STATE .....

FOUR REASONS WHY PLANT

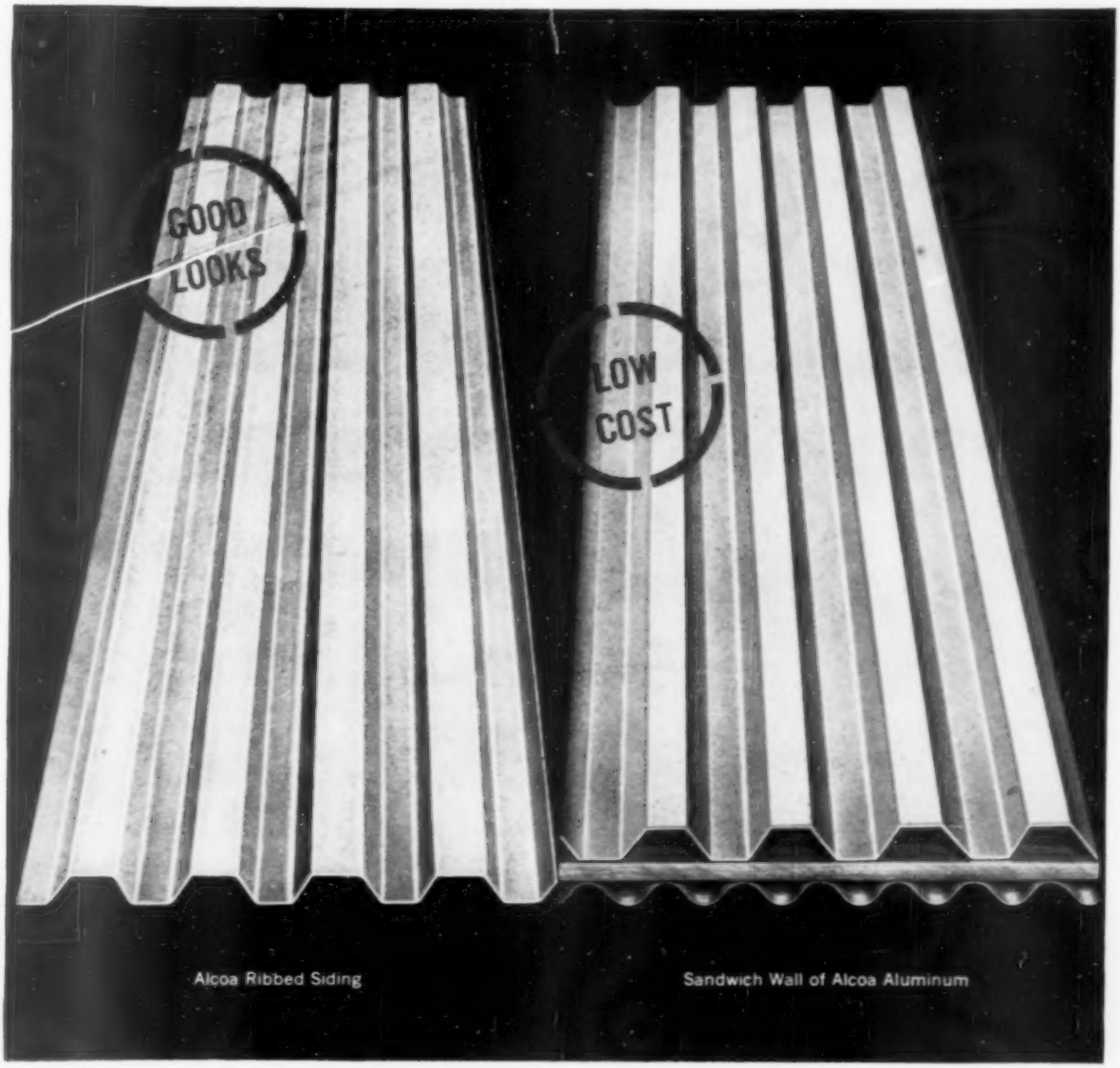


Save construction money now and maintenance costs later with these Alcoa® Aluminum Industrial Building Products and Materials . . . for both new plants and plant expansion:

1. Humid atmospheres and industrial fumes mean nothing to Alcoa Corrugated Roofing and Siding. Once up, that's it! No painting, no expensive maintenance of any kind!
2. Aluminum-clad industrial buildings can be *strong buildings* with Alcoa V-Beam Roofing and Siding. Safely carries 30-lb/sq-ft uniform load on a 10-ft purlin spacing.
3. Aluminum-clad industrial buildings can be *good looking buildings* with Alcoa Ribbed Siding. This carefully designed configuration makes buildings clean-lined with good vertical shadows from the ribbed pattern.
4. Sandwich wall of Alcoa Aluminum is the lowest cost insulated metal wall system known! With a U value of .155, it has three times the insulating value of 8-in. brick. Goes up fast, too. Permits economical air conditioning.

All of these materials deliver the benefits inherent in aluminum—corrosion resistance, low cost and good looks. And they are sold and erected by Alcoa Approved Applicators. For complete data, mail coupon on next page. Aluminum Company of America, Alcoa Building, Pittsburgh 19, Pennsylvania.

CONSTRUCTION IS GOING ALUMINUM



Alcoa Ribbed Siding

Sandwich Wall of Alcoa Aluminum

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM
INDUSTRIAL BUILDING PRODUCTS
ALUMINUM COMPANY OF AMERICA

"ALCOA THEATRE"
Exciting Adventure
Alternate Monday Evenings

ALUMINUM COMPANY OF AMERICA
862-D, ALCOA BUILDING, PITTSBURGH 19, PA.

Please send FREE book packed with technical information on how to build and save money with Alcoa Aluminum Industrial Building Products and Materials.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

For more facts circle 467 on Reader Service Card

LET MAGNA repeat these savings

VISIT CP BOOTH 1804
See These Tools In Action:
- Torque Control Tools (Cam-tork and Magnamatic)
- Broaching
- Multi-spindle

Breakage of plastic handles was spiralling assembly costs at the Line Material Industries, Zanesville, Ohio. The culprit—overtightened screws which caused a large number of handles to hit the scrap bin daily.

A CP Magnamatic screwdriver was installed in September 1956 and has been saving this company over $2000 a year in spoilage alone. Assembly time has been cut by 12%. The Magnamatic One-Shot Clutch runs each screw to the exact pre-set torque then "shifts to neutral"—virtually eliminating breakage. There's no ratcheting, burred screw heads or damaged work. And the uniformity of the Magnamatic's precision tightening action provides a final product inspection that assures complete quality control...eliminates any need for final hand torquing.

Get the facts first hand! Mail the coupon today for prompt action or detailed information!

MATIC
in your plant!

Chicago Pneumatic

Pneumatic Tools • Air Compressors • Electric Tools • Diesel Engines • Rock Drills
Hydraulic Tools • Vacuum Pumps • Aviation Accessories

Chicago Pneumatic Tool Company, Dept. M-88
8 East 44th Street, New York 17, N. Y.

- ☐ Please send me FREE booklet SP-3165 "Magnamatic Case Histories."
- ☐ Please send me "Magnamatic" Bulletin SP-3126.
- ☐ Have representative call.

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State____

For more facts circle 468 on Reader Service Card

DRINK
PEPSI-COLA
ICE-COLD

Employees are saying: "Let's have Pepsi, Please"!

Here's a suggestion that's sound from everyone's angle. On-the-job refreshment eases strain, promotes efficiency. Pepsi-Cola's the preference of today's active people. And you can provide this modern, *light* refreshment for your employees with no investment at all—in fact, a machine vending Pepsi actually pays substantial profits.

There's a machine to suit your needs, vending Pepsi-Cola in disposable paper cups or in the convenient single-drink bottle. Write for full details: National Accounts and Syrup Sales Dept., Pepsi-Cola Company, 3 West 57th St., New York 19, N. Y.

For more facts circle 469 on Reader Service Card

Drill

Model 75 completes over 36,000 drillings for this company on one job without maintenance or repair. The foreman* on the job said: "Didn't think they would hold up running continuously, but they did and finished the job on time."

Close-up shot showing continuous drilling assignment in ⅛" hot rolled steel plate. The owner* says: "We are standardizing on SKIL Drills. We have had our present Model 75s over a year. Although they have had many days of rough continuous use, we have yet to have them serviced."

holes by the thousands *continuously* with SKIL Drills!

because SKILMANSHIP prevents overheating, burn-outs, fatigue

Avoid loss of production time waiting for drill motors and housings to cool. Eliminate constant brush changes. Reduce operator fatigue due to loss of drill power.

SKILMANSHIP distinguishes the SKIL line of drills from all others. It means the ability to take continuous production drilling and stand up. For example, the SKIL Model 75 was used to drill over 36,000 holes in ⅛" hot rolled steel plate. Ordinarily, a drill would not hold up under such extensive drilling in tough steel. Unable to purchase a stationary drill press, the company had to use the Model 75 and the job was finished on schedule. No time was lost in maintenance or repair.

At another company the Model 75 drills 1000 holes in sheet metal units—one right after the other—without heating up. The same quality is evident in all sizes of SKIL Drills. The big 1" Model 163 drill makes more than 100 drillings in 1" steel beams in *50% less time* than a radial drill press. It is faster because it can take continuous drilling.

SKIL has the complete line of drills—from ¼" to 1"—each built to do any job faster and take continuous drilling. This SKILMANSHIP quality prevents motor overheating, burn-outs or operator fatigue. Ask your SKIL distributor for a Proof Test of any one of these tools.

"STANDARDIZE ON SKIL." Every day more companies adopt this slogan. Factory-branch service stations located in 33 major cities throughout the country are equipped to give prompt and dependable service on all SKIL Tools, so it pays to "standardize on SKIL." Look for the SKIL trademark in the yellow pages of your phone directory.

SKIL

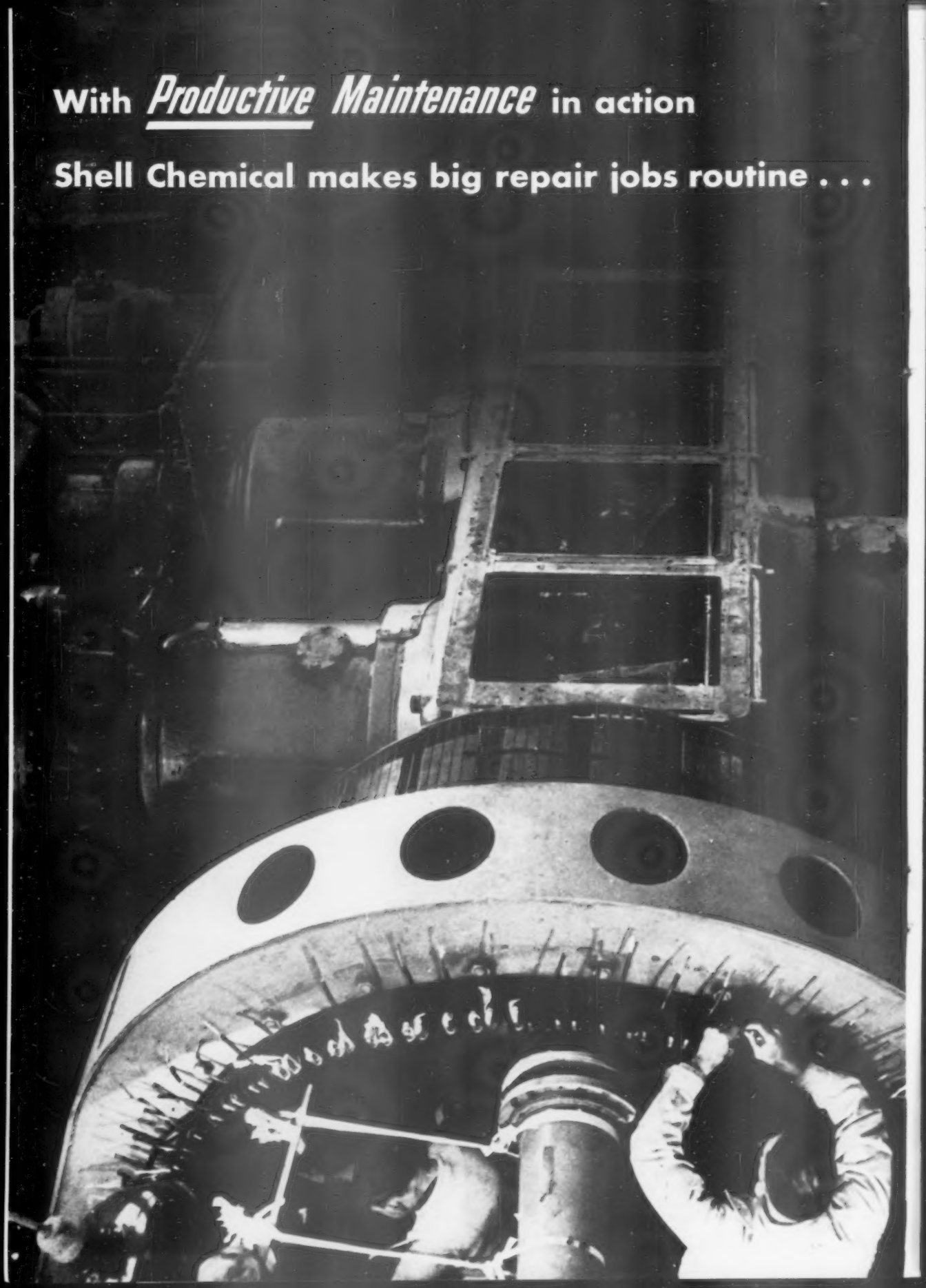
Made only by SKIL Corporation, manufacturer of famous SKIL and SKILSAW products, 5033 Elston Avenue, Chicago 30, Illinois. In Canada: 3601 Dundas Street West, Toronto 9, Ontario.

This trailer company* uses SKIL Model 243 heavy-duty ¼" drill to turn out about 3500 holes per unit—fast. "We need drills that can take it," says the foreman, "and the Model 243 runs continuously until the job is finished."

The plant engineer* in this industrial shop states that the SKIL Model 163 Drill is 50% faster than previous methods of drilling. These 1" steel beams require more than 100 drillings—one right after another.

For more facts circle 470 on Reader Service Card

*Names supplied upon request


With Productive Maintenance in action
Shell Chemical makes big repair jobs routine . . .

Four key motors totaling 7500 hp overhauled in 96 hours

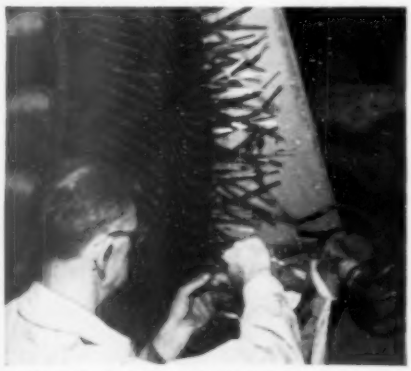
On-the-job overhaul by G-E Service Shop made the difference when Shell had to complete major overhaul in 4 days

At Shell Chemical's plant in Pittsburg, Calif., a recent *Productive* Maintenance project called for the planned overhaul of four large synchronous motors by General Electric's San Francisco Service Shop. Shell's schedule allowed only 96 hours to complete work on all four motors. Thus, fast service was a "must."

General Electric's San Francisco Service Shop, working closely with Shell personnel, scheduled a crew of 24 men to work in two 12-hour shifts. They began with a midnight shift, continued round-the-clock, and ended four days later, *on time*.

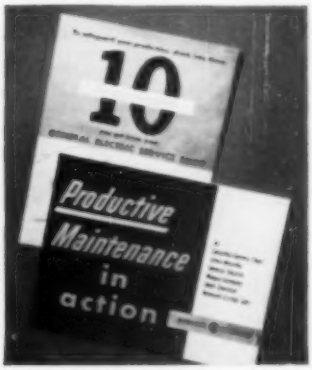
What Shell's Experience Means To You. The next time you schedule major overhauls or any electric repair service call *your* General Electric Service Shop. It is part of a nationwide organization having facilities strategically located to give you complete repair and overhaul service. You get speed, unmatched quality, and experience—*and it's as near as your telephone.*

For additional information, write today for the bulletins shown below, to General Electric Company, Section 690-4, Schenectady 5, N. Y.



MAKING SERIES CONNECTION on one of Shell's 1750-hp synchronous motors required the experienced skill of this G-E San Francisco Service Shop repair specialist.

IMPORTANT PART OF JOB at Shell Chemical was cleaning air ducts with special G-E solvent. Workmen used unique brush to achieve this and wore a mask as a safety measure.



FREE BULLETINS tell how you can make maintenance profitable: GED-3465, "Ten Service Benefits," and GED-3278, "P-M in Action."

Progress Is Our Most Important Product

GENERAL ELECTRIC

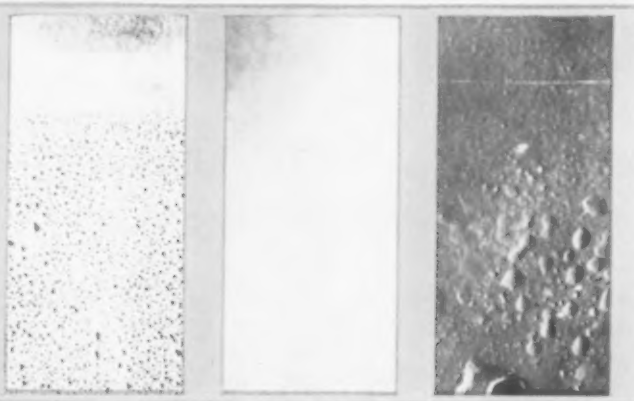
For more facts circle 471 on Reader Service Card

Maintenance and Corrosion Engineers—

these are the facts

TOTAL WATER IMMERSION—5700 HOURS

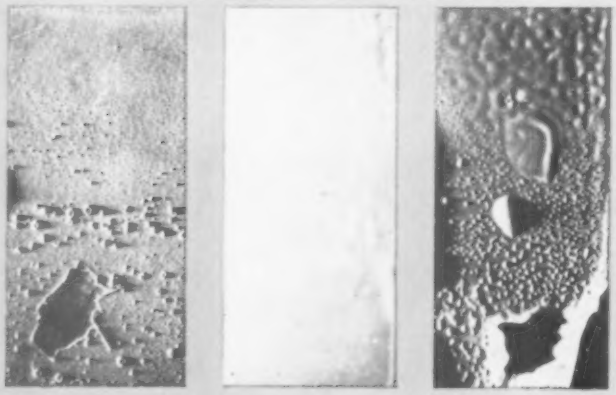
Coating "A" M/M Urethane Coating "B"



Two standard proprietary corrosion-resistant systems and a Mondur/Multron urethane coating were exposed at equal film thickness to total water immersion for 5700 hours. Test results shown at right.

SOUR CRUDE OIL IMMERSION—2600 HOURS

Coating "A" M/M Urethane Coating "B"



Two leading corrosion-resistant coatings and an M/M urethane coating were subjected to sour crude oil immersion, all at equal film thickness, for a period of 2600 hours, with results shown in these unretouched photos.

Mobay Chemical Company
Dept. K-1
1815 Washington Road, Pittsburgh 34, Pa.

Please rush further information and sources of supply for M/M urethane coatings to:

Name_____ Title_____

Company_____

Address_____

# of coatings life . . .

Which coating would you specify?

These unretouched photos of steel test panels show how air-dry urethane coatings, made with Mondur/Multron resins* stood up under severe corrosion conditions in a recently-completed comparative test with two other corrosion-resistant coatings; one a single-component system, the other a two-component system.

The M/M urethane coating was matched against these proprietary coatings at equal film thickness for periods up to eight months in (a) total water immersion, (b) sour crude oil immersion and (c) 95-100 per cent relative humidity.

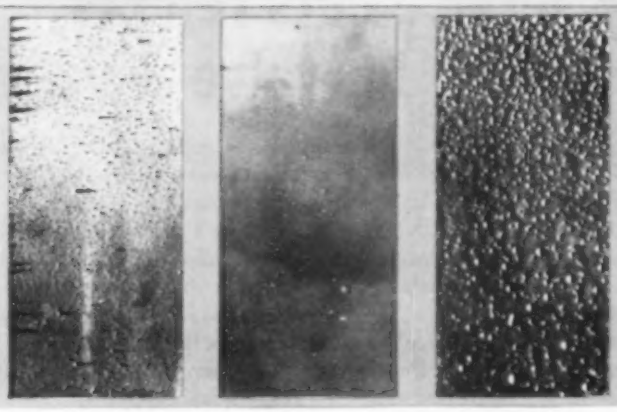
**These test results apply only to urethane coatings formulated with Mondur/Multron resins in accordance with standards prescribed by Mobay.*

The test panels tell the story! The traditionally-standard corrosion-resistant systems both show severe blistering, film peeling and total film failure; the M/M urethane coatings emerged virtually unscathed.

If you specify industrial coatings for your company, you can't afford to ignore these results. Ask your paint supplier about *urethane coatings formulated with Mobay's Mondur/Multron or Mondur CB resins*—or write Mobay direct for additional data and sources of supply.

95-100 PER CENT RELATIVE HUMIDITY—2600 HOURS

Coating "A" M/M Urethane Coating "B"



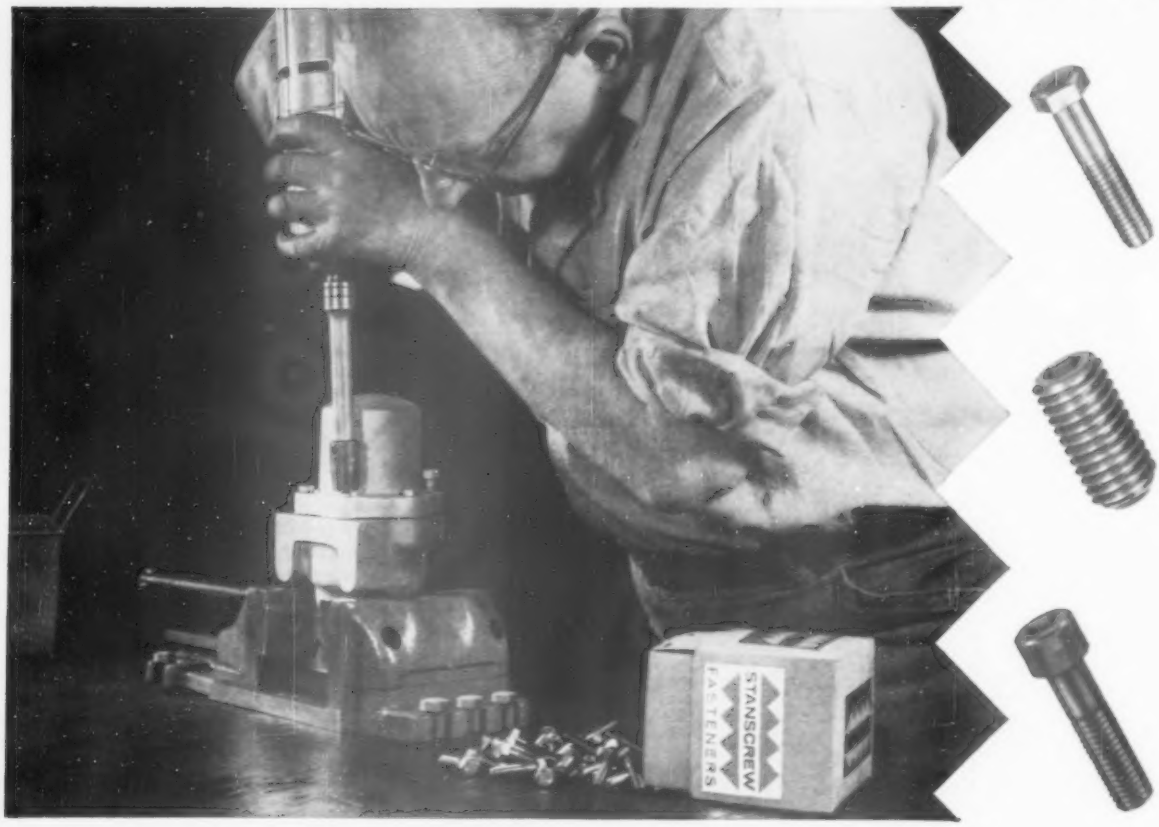
Standard steel test panels, coated with commercial one-component and two-component corrosion-resistant finishes, were compared with M/M urethane coating after simultaneous exposure to 95-100 per cent humidity for 2600 hours.

Mondur/Multron® are trade names of Mobay Chemical Company Pittsburgh 34, Pa.

MOBAY

First in Urethane Chemistry

For more facts circle 472 on Reader Service Card



Stanscrew service cuts rejects, speeds assembly for valve manufacturer

A prominent manufacturer of 4-way valves for freon was having trouble on his assembly line. His fasteners, tightened to an extreme degree to prevent seepage of the gas, were breaking on too many occasions. This meant complications in assembly and a high reject rate—which increased production costs substantially.

One of Stanscrew's fastener specialists, called in by a Stanscrew distributor, quickly found the answer. He recommended a standard cap screw and had staff engineers work out the precise torque which should be applied to insure a complete seal at all gaskets, yet eliminate any possibility of fastener breakage. By following these recommendations, the manufacturer has eliminated the problem of fastener breakage, and substantially reduced his reject rate.

Stanscrew offers over 4,000 standard fasteners . . . including a complete selection of socket, set, and cap screws. All are produced under rigid quality control methods and incorporate the lessons learned during 85 years of fastener manufacture. All 4,000 are always in stock and quickly available.

For the answer to your fastener problem, call your Stanscrew distributor. He will have a Stanscrew fastener specialist promptly study your operation and make specific recommendations.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

For more facts circle 473 on Reader Service Card

For more facts circle 474 on Reader Service Card ➤

SYLVANIA

INDUSTRIAL LIGHTING HELPS

Helpful data and suggestions on plant lighting—drawn from the Sylvania Fixture files for your use

Route to:

1. _____
2. _____
3. _____
4. _____
5. _____

NO. 1 OF A SERIES

Are you sure your plant illumination is adequate? Is it pulling its share of the load in cutting costs? Is it profitable? This compact 4-page guide will help you answer these questions quickly . . .

HOW GOOD LIGHTING CAN UNCOVER HIDDEN OPERATING COSTS—AND PROFITS—IN YOUR PLANT

In this age of automation and other great production advances, more and more alert plant operating men are becoming aware of the many hidden profit advantages in improved plant lighting. The lighting in many factories today is years behind the times . . . and management doesn't even realize it.

Many carefully made before-and-after studies of plants where the lighting was improved continue to support these findings. Big savings *can* be realized, *if* lighting improvements are actually needed, *if* new lighting is correctly planned and installed to solve the real problems, and *if* correct maintenance procedures are carried out.

Make lighting a production tool

One outstanding characteristic in all the *successful* plant lighting improvements studied seems to be the approach of the plant operating men to lighting. They regard lighting as a full-fledged production tool . . . one that can and does have a serious effect on production, quality, many operating costs.

Plant lighting is considered as much a part of plant machinery as any machine tool, assembly jig or inspecting instrument.

What lighting improvements—if any?

The first logical step, of course, is to turn a critical eye on your own plant. Does your present lighting need improvement? Then, how do you measure and evaluate your present lighting? Where is it good . . . and where is it inadequate?

MODERN LIGHTING IS A PRODUCTION TOOL

In modern machine shops and precision-work areas, quality and quantity of illumination has been proved a major factor in the quality and quantity of work turned out. These findings apply to other plant work areas, too.

Sylvania engineers have compiled this compact 4-page lighting evaluation guide to help you answer these basic questions quickly and easily. A few moments of your time invested in it could turn out to be the best cost-saving move you make all year. *The Self-Evaluating Lighting Tables on Pages 3 and 4 are designed to help you* make sound personal judgments of your existing lighting system.

TO THE READER

To give you the practical, worthwhile data you need to evaluate the present lighting in your plant, Sylvania engineers have compiled this compact 4-page plant lighting guide. It gives you reliable rule-of-thumb standards by which to make preliminary measurements. It is the first in a series of informative folders on plant lighting to be published by Sylvania in the coming year.

Here's proof!

PLANNED INVESTMENT IN GOOD PLANT LIGHTING PAYS LASTING DIVIDENDS—EVERY DAY

Below are listed a few of the many realistic benefits of good lighting that many plants are now realizing. Look them over carefully . . . perhaps one or more of these problems have been plaguing your plant. See what improved lighting did to help others solve their problems.

Better Lighting can IMPROVE PRODUCTION

A major industrial firm reports: "Better production rates, fewer rejects, elimination of supplementary lighting, less tool breakage, no production lag, a smaller maintenance bill . . ." All these benefits, and many more, were observed after a new plant lighting system had been installed.

Better Lighting can REDUCE MATERIAL REJECTS . . . IMPROVE EMPLOYEES' MORALE

A large Illinois industrial firm reports many benefits from good lighting in its new die-casting and machining plant. Modern industrial fixtures with 25% upward light component helped achieve a predetermined lighting level of 85 footcandles overall. The company's chief electrical engineer says:

(1) "*We are getting better (machining) results than ever, and fewer rejects, because of* this lighting setup."

(2) "The night shift men *machine just as many parts* as our day people and *work with the same proficiency*. Without an exceptionally well-lighted plant, we know this comparison would reflect a variation."

(3) "We use small bits on many of the drill presses (which) will snap at the slightest off-pressure. We had a great deal of breakage of these bits before the present lighting installation. With better lighting, we have *eliminated this costly bit replacement*."

Better Lighting can SPOT DEFECTS FASTER

The plant engineer of a large Southern textile mill reports that a new lighting system in the weave room paid for itself in 3 years! It raised the lighting level from 17 to 56 footcandles, enabled the operator to spot defects himself, eliminated need for inspectors to use drop-cord portable lights. An immediate reduction in quantities of defective material was noted in the cost columns.

Better Lighting can ELIMINATE SUPPLEMENTARY LIGHTING

A large Cleveland industrial plant was able to eliminate costly and annoying supplementary lights on machine tools and in precision-work areas—with a well-planned lighting system. Highly critical work, requiring tolerances of .001" and constant visual checks with micrometers, is now performed comfortably and conveniently without the need of additional lights which had to be used with the old lighting system.

The assistant general manager reports: "Any breaks due to metal failures can now be spotted immediately, which means saving of tools which would otherwise be lost if a break or failure were spotted too late."

Better Lighting can CUT DOWN ON MATERIAL WASTE

The chief industrial engineer of a new greeting card plant in the North reports a drastic reduction of errors in the order-filling department as a result of good lighting. Industrial fixtures with 25% upward light brought up to 100-footcandle lighting level to this area where clerks must pick from as many as 600 different items along any given 100-foot stretch, then process copies and invoices promptly.

Better Lighting can REDUCE ACCIDENTS, ABSENTEEISM

As a result of new lighting, all the companies listed above reported significant reductions in the number of accidents and total absenteeism.

All the plant lighting benefits reported here were gathered from case history studies now in Sylvania's files. Actual names and addresses will be furnished on request.

Step-by-step method is easy to use:

HOW TO EVALUATE YOUR PRESENT LIGHTING

Nobody can determine what type of lighting is right for your plant without first making a careful study of the floor plan, the machinery, the production techniques used. However, if you wish to get a reasonably good idea as to the adequacy of your present lighting, utilize the criteria on this page and the page that follows.

To make this simple evaluation, you need only one piece of equipment—a footcandle meter which measures the quantity of light received at a given surface. If you don't have a footcandle meter designed specifically to measure footcandles, certain ordinary photographic exposure meters are satisfactory for the purpose. Two different types can be used: (1) those that measure footcandles directly, and (2) those that provide conversion tables from which footcandle measurements can be read. (Photographic exposure meter readings are reliable enough for this evaluation, though usually not as accurate as a regular footcandle meter.)

How to take footcandle readings

Lay or hold the meter against various working surfaces such as a desk, drawing board, or the top of an assembly jig. The meter's photoelectric cell surface is pointed upward at a right angle from the working surfaces. (Photographers usually refer to footcandle readings taken this way as "direct light readings.") Record and label all readings.

Next step is to refer each of the footcandle readings to the table (at right). It was specially prepared by the Illuminating Engineering Society for industry, and it gives what are considered *bare minimum footcandle levels* for each type of work area.

MINIMUM RECOMMENDED VALUES OF ILLUMINATION FOR INDUSTRY*

(General recommended practice . . . footcandles in service on task or 30" above floor)

	Footcandles
MOST DIFFICULT SEEING TASKS . . . **Finest Precision Work**	200 to 1000
Involving: Finest Detail; Poor Contrasts; Long Periods of Time	
Such as: Extra-fine Assembly; Precision Grading; Extra-fine Finishing	
VERY DIFFICULT SEEING TASKS . . . **Precision Work**	100
Involving: Fine Detail; Fair Contrasts; Long Periods of Time	
Such as: Fine Assembly; High-speed Work; Fine Finishing	
DIFFICULT or CRITICAL SEEING TASKS . . . **Prolonged Work**	50
Involving: Fine Detail; Moderate Contrasts; Long Periods of Time	
Such as: Ordinary Bench Work and Assembly; Machine Shop Work; Finishing of Medium to Fine Parts; Office Work	
ORDINARY SEEING TASKS	30
Involving: Moderately Fine Detail; Normal Contrasts; Intermittent Periods of Time	
Such as: Automatic Machine Operation; Rough Grinding; Garage Work Areas; Switchboards; Continuous Processes; Conference and File Rooms; Packing and Shipping	
CASUAL SEEING TASKS	10
Such as: Stairways; Reception Rooms; Washrooms and other Service Areas; Active Storage	
ROUGH SEEING TASKS	5
Such as: Hallways; Corridors; Passageways; Inactive Storage	

*Illuminating Engineering Society

It is advisable first to evaluate the lighting level for each basic work area—whether it is above or below standard—then to evaluate the overall picture of your plant's lighting as a summary of the conditions noted in all work areas. Remember, there are many efficiency-minded manufacturers who would not tolerate lighting levels even as "low" as those shown above in their plants.

IMPORTANT ADVICE . . .

If you should consider plant relighting, don't plunge blindly into it. And don't settle for buying and hanging a few more fixtures . . . this is only a stop-gap measure which does not really solve any problem. *The only profitable approach is to plan your lighting* to suit your needs best and get the best value for your money. On request, a Sylvania Fixture Specialist or illumination engineer will be glad to assist with any lighting problems you might have.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

(First Class Permit No. 20, Salem, Mass.)

SYLVANIA ELECTRIC PRODUCTS INC.

Lighting Fixtures

One 48th Street

Wheeling, West Virginia

Quality or Adequacy of Lighting

Now that you have checked footcandle level or "quantity" of illumination, you should check yourself on its other major characteristic—"quality." To determine the adequacy of your lighting system, check a YES or NO answer to each of the following questions:

	YES	NO
Has your lighting system been installed since 1948?		
Is the lighting level (footcandles at working height) as high as the IES– recommended level for the task being performed? (*See value chart on Page 3.*)		
Are the variations in footcandle readings less than 30%?		
Are your lighting fixtures mounted in continuous rows?		
Is the spacing between fixture rows no more than the height of the fixtures above the floor?		
Are your workers protected from both direct and reflected glare? (Direct glare results from a bare lamp in the normal field of view. Reflected glare is light reflected by a polished surface into the eyes.)		
Do your workers comfortably perform all but the very highest precision work without supplementary lighting?		
Are your ceilings, walls and floors light in color?		
Have your fixtures been cleaned within the past 6 months?		
Have the lamps in your fixtures been changed within the past 5000-6000 hours (of their actual use)?		
TOTALS:		

How does your lighting measure up?

If you can honestly score YES on all or almost all the above questions, your lighting is probably good to excellent. But if there are more than one or two NO answers, you have some idea about the condition of your present lighting as against what it should be.

Valuable Data for You

When you get to the point of thinking ahead on a program for relighting your plant, these three basic factors should be kept in mind and weighed in detail before buying:

(1) Quality and quantity of light needed—in each location, and overall.
(2) Type of lighting layout needed.
(3) Selection of proper fixture type.

If costs present a problem, you might consider doing what other plants have done very successfully. Set up a continuous (e.g., 10-year) group replacement plan for your fixtures, relighting a specific one-tenth or more of your floor area each year. Your whole plant will then be relighted at the end of each replacement period. Funds can be budgeted out of yearly operating expenses, and the plant enjoys the latest in lighting, year-by-year.

Your regional Sylvania Fixture Specialist is an experienced expert in all phases of industrial lighting. He will be glad to talk over your particular lighting problems with you, giving you the help you might need—at no cost or obligation. Also, Sylvania's new 24-page book, "Prescribed Lighting Protects the Eyes of Industry," gives a wealth of data on all phases of your industrial lighting. It's yours for the asking . . . if you simply tear out and send the attached order card which needs no postage.

USE THIS HANDY BUSINESS REPLY CARD FOR ADDITIONAL DETAILED INFORMATION ON DIFFERENT PHASES OF INDUSTRIAL LIGHTING

At no cost or obligation to me, please . . .

☐ Have a Sylvania Fixture Specialist call on me.
☐ Send your 28-page booklet, "Prescribed Lighting Protects the Eyes of Industry."
☐ Send Complete Sylvania Fixture Catalog.

Name_____

Position_____

Firm_____

Address_____

City_____ Zone_____ State_____

SYLVANIA

FLUORESCENT LIGHTING FIXTURES AND SYSTEMS

Best Fixture Value in Every Price Range

SYLVANIA ELECTRIC PRODUCTS INC.
Dept. 200, Lighting Division—Fixtures
One 48th Street, Wheeling, West Virginia

LIGHTING • TELEVISION • RADIO • ELECTRONICS
PHOTOGRAPHY • ATOMIC ENERGY
CHEMISTRY-METALLURGY

BURGLARS BEWARE!

1. Install a Kidde Ultrasonic Burglar Alarm System, and thieves don't stand a chance. Even a lock-in's first move gives him away! *And* the system is *tamper-proof!*

2. The Kidde Ultrasonic Burglar Alarm System is extremely portable, easy to install, plugs into any standard AC electrical outlet. Can be moved to new locations.

3. From small units like the one shown above, sound waves too high to be detected saturate the entire area, give *complete* wall-to-wall, floor-to-ceiling protection.

4. Any movement in the protected area immediately triggers an alarm. System may be connected to a central alarm station, as illustrated in the photo above.

5. In a proprietary system, the Kidde Ultrasonic Burglar Alarm sounds alarm in guard rooms, can also sound alarm at local police station, insures immediate detection.

6. If preferred, local "on-the-spot" alarms may be used. Whichever method is employed, with the Kidde Ultrasonic Burglar Alarm System you get *fast sure* protection.

Simple to install, easy to maintain,
the Kidde Ultrasonic Burglar Alarm System represents a great step forward in the security field. Transmitting waves of sound too high to be heard by the human ear, the Kidde system immediately detects any attempt at a break-in, gives complete wall-to-wall, floor-to-ceiling protection. Properly installed, the Kidde system qualifies for an Underwriters' Laboratories Number Two certification. Write for more information about truly low-cost burglar protection.

Kidde

ULTRASONIC DIVISION
Walter Kidde & Company, Inc.
432 Main St., Belleville 9, N. J.

Walter Kidde & Company of Canada Ltd.,
Montreal — Toronto

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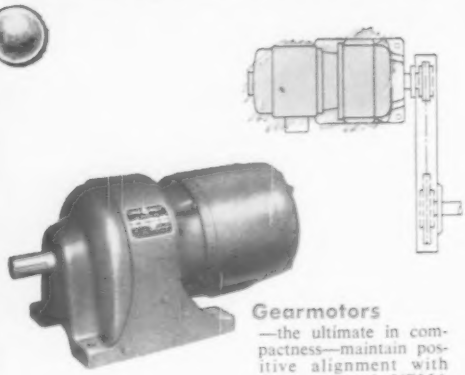
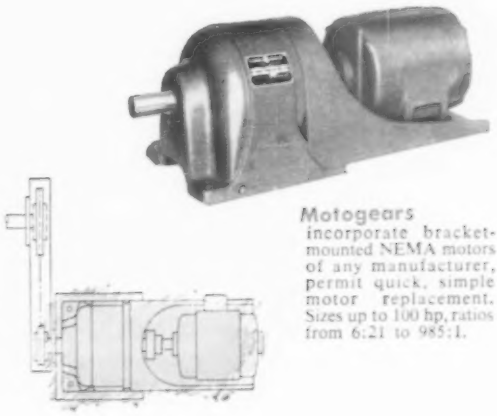


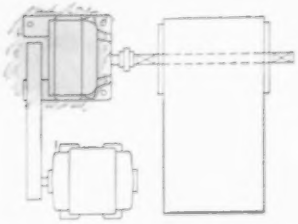
Gearmotors
—the ultimate in compactness—maintain positive alignment with flange-mounted NEMA motors. Double or triple reductions, sizes to 100 hp, speeds from 280 down to 1.8 rpm.

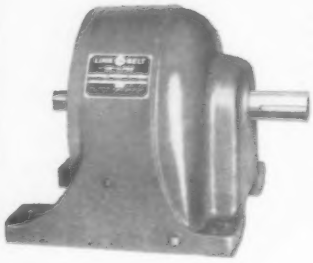


Motogears
incorporate bracket-mounted NEMA motors of any manufacturer, permit quick, simple motor replacement. Sizes up to 100 hp, ratios from 6:21 to 985:1.

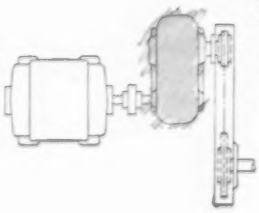
Go ahead-- arrange any speed reduction setup !

complete

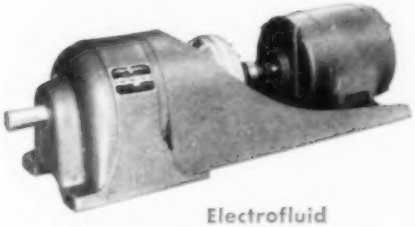


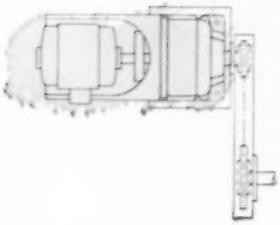


In-Line Helical Gear Drives
let you mount the motor where you want it . . . save space with input and output shafts located on same planes. Ratios 6.2:1 to 2217:1, capacities to 206 hp.



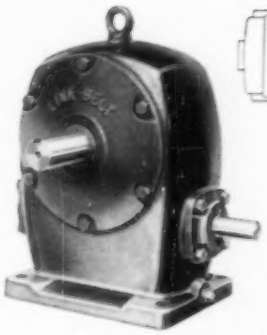
Parallel Shaft Drives
are built to shrug off heavy shock loads. For facts on ratios to more than 300:1 and hp capacities to over 2000.

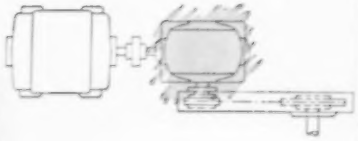




Electrofluid Drives

with *"Cushion Action"* offer smooth acceleration, overload protection, shock absorption, low starting current, high starting torque without overpowering.





Worm Gear Drives

— for high-ratio speed reduction with right-angle takeoff. Made with single, double or helical worm gear combinations, ratios 3.1:1 to 8000:1.

LINK-BELT's complete line gives you

flexibility

Fill your need exactly, fill your order quickly from local stocks

Whatever the factors determining your choice of a speed reducer—ratio, space, shaft position, shock loading—look to industry's most comprehensive line. For Link-Belt builds *six* basic types, each in a full range of sizes and ratios . . . gives you full freedom in layout.

There's still another big *plus* in dealing with a *power transmission specialist*. Link-Belt makes all related drive components—chains and sprockets, bearings, couplings—all dimensionally correlated with these reducers. No alignment problems, no need to exchange drawings with other suppliers. And with over-all efficiency thus assured, power consumption is markedly reduced.

Next time you need a speed reducer, call your nearby Link-Belt office or authorized Link-Belt stock-carrying distributor. From complete stocks, he'll supply the finest of its kind—and point out features that prove it.

LINK-BELT

SPEED REDUCERS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

14,107

For more facts circle 476 on Reader Service Card

Westinghouse Life-Line A motors save $200 a year in rewinding costs alone

...at Rumford Chemical Works, Rumford, R.I.

Westinghouse motors are reliable for 24-hour, 7-day week operation in sulphuric acid manufacture

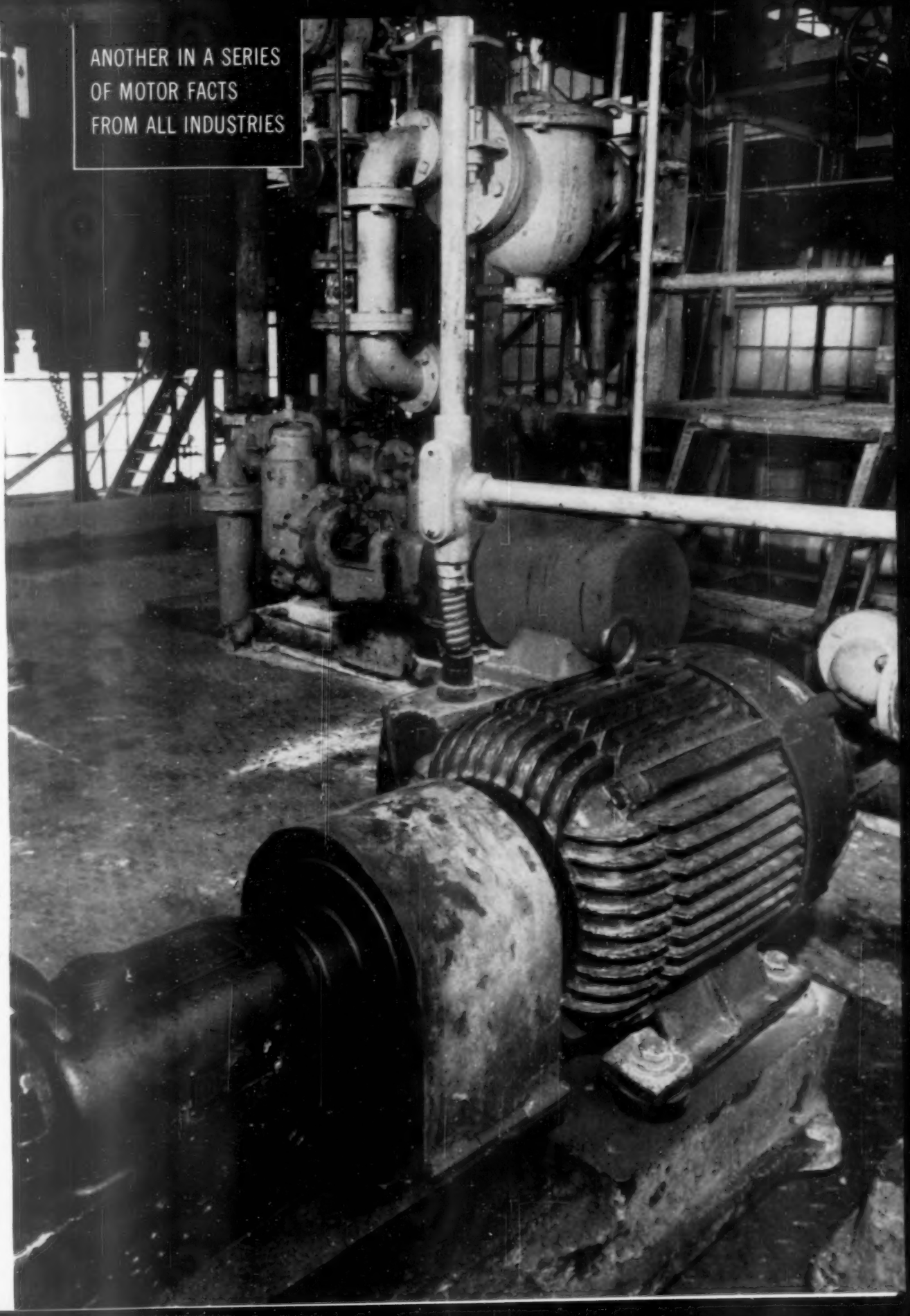
"In the four years we have used Life-Line® "A" motors, we have never stopped the process because of a faulty motor," reports Mr. John E. Harvey, Plant Engineer at Rumford Chemical Works.

Before installing Life-Line "A" motors, the Rumford Chemical Works had to rewind, on an average, two motors a year at a cost of $100.00 per motor . . . always because the corrosive atmosphere put them out of operation. "We no longer have this problem," reports Mr. Harvey, "since the totally enclosed Life-Line "A" motors give us reliable, continuous operation without fear of damage from spilled acid which could come from leaks or breaks in the pipes."

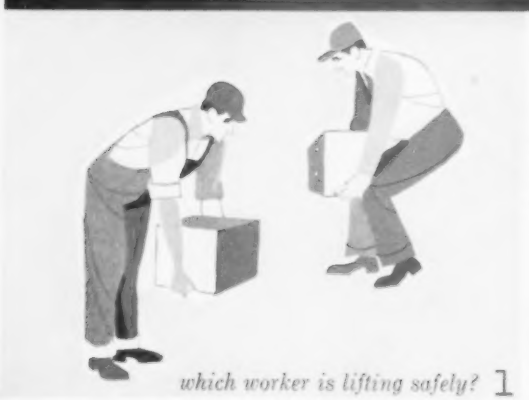
POWER-UP with Life-Line "A" motors designed for modern industry's needs. For more facts, call your Westinghouse sales engineer or distributor. Or write Westinghouse Electric Corporation, P.O. Box 868, 3 Gateway Center, Pittsburgh 30, Pennsylvania. J-22059-R

Mr. Harvey with a 7½-hp Life-Line "A" which drives a sulphuric acid pump in the process at Rumford. This totally enclosed unit has been in operation for over two years.

YOU CAN BE SURE...IF IT'S Westinghouse


ANOTHER IN A SERIES
OF MOTOR FACTS
FROM ALL INDUSTRIES

do your employees know the answers?



which worker is lifting safely? 1

2 *which safety rule is this worker violating?*

should hand trucks or carts be pulled or pushed downhill? 3

4 *is this worker following good safety practice?*

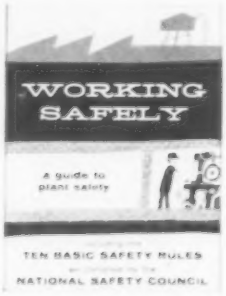
Give your workers a safety refresher course with "Working Safely"... a new safety booklet available from your STEEL SERVICE CENTER stocking Inland 4-WAY® Safety Plate

Safety is a subject we can never learn too much about. That's why you will be doing yourself and the employees in your plant a favor by providing them with copies of this new pocket-size guide to plant safety. "Working Safely" has been compiled by the Safety Engineers of Inland Steel Company and includes the ten basic safety rules of the National Safety Council as well as safety tips on many other subjects.

Copies of this booklet are available from your STEEL SERVICE CENTER.

Another Good Safety Rule—To cover those areas in your plant and on your products where feet and wheels must have safe, sure traction, use Inland 4-WAY Safety Plate . . . 4-WAY is available in large, medium or small pattern, in a wide range of sizes and gages, from your local STEEL SERVICE CENTER . . . the most logical source of supply for less-than-carload orders of steel and specialized steel services.

INLAND 4-WAY® SAFETY PLATE



answers:

1. Worker on right is lifting safely. Always bend knees when picking up heavy loads.

2. No safety shoes! He's risking a broken foot or toe!

3. Pushed... always. When you pull a cart, it can get away and run you down.

4. No! Never paint a ladder. It covers up cracks and weaknesses. Use clear varnish instead.

Inland Steel Company
30 West Monroe St., Chicago 3, Illinois

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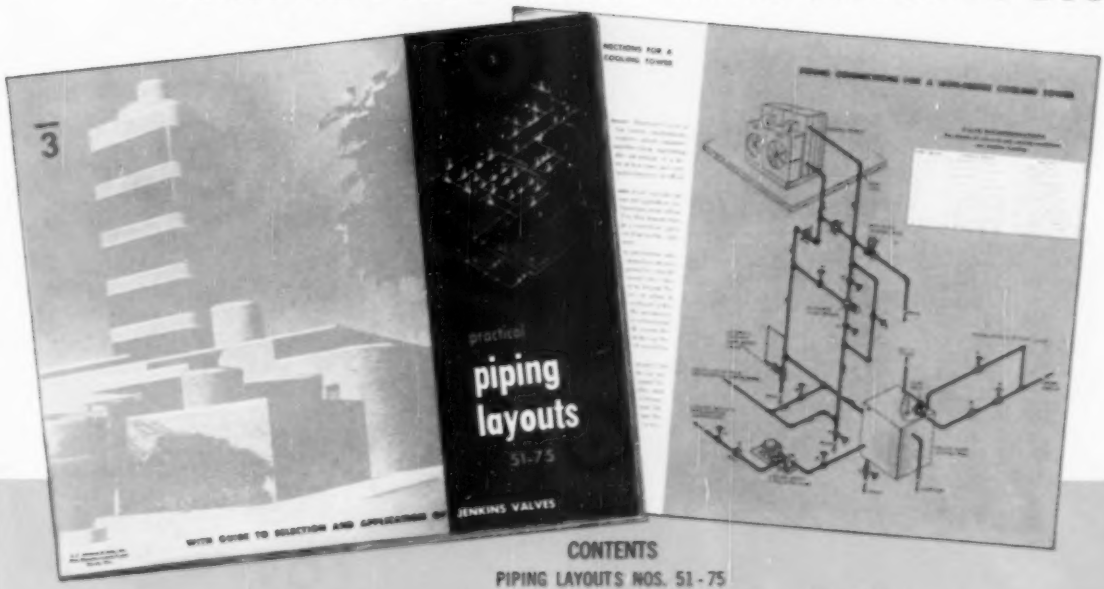
AVAILABLE NOW! no. 3

in the famous series of JENKINS PRACTICAL PIPING LAYOUTS Books



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71	Piping Connections for a Non-Freeze Cooling Tower
72	Sulfate Pulping Process System
73	Piping for Acid Liquor Preparation in the Sulfate Pulping Process
74	Sulfate Pulping Liquor Recovery System
75	Piping Connections for Space Heating with Refrigeration Condenser Hot Water Discharge

PLUS 10 PAGES OF VALVE SPECIFICATIONS

Volume 3 is a 36-page collection of 25 basic piping diagrams with complete recommendations for valve selection and location in the lines. The material has been prepared by registered consulting engineers in collaboration with the Jenkins Bros. engineering staff and leading equipment manufacturers. It supplements the two booklets released by Jenkins Bros. in past years as a service to consulting engineers, architects, contractors, specification writers and plant operation managers.

In addition to the piping diagrams, this book contains a ten-page, illustrated quick-reference specification "chart" which gives essential data on the complete line of Jenkins Valves.

JENKINS VALVES

LOOK FOR THE JENKINS DIAMOND

JENKINS SINCE 1864

Jenkins Bros.

Sold Through Leading Distributors Everywhere

For your copy, *please request Volume 3, Jenkins Practical Piping Layouts on your letterhead. Write to* JENKINS BROS., *Room 47, 100 Park Ave., New York 17.*

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10 reasons why the Signode SFC is the savingest tool for strapping

$ With the SFC, one handle does the tensioning and the sealing. That's why one hand is free to align the straps and move the package. The SFC is the only one-hand seal feed tool. But that's not all.

$ You can put a cartridge of 50 Signode seals into the SFC magazine in a few seconds...as quickly as placing a loose seal on a strap. No seals wasted.

$ The SFC is the simplest of all seal feed tools to learn about and to operate. Even our advertising agency man learned to use it in about 7 minutes.

$ The SFC will not operate unless the strap is properly aligned. In most seal feed tools misalignment wastes strap. It can't happen with the SFC.

$ Plenty of power...easily. The smooth-working SFC has a good long handle... straps directly from the dispenser. It's as good on big packages as on small ones.

$ The SFC weighs only 6½ pounds, loaded. It's the lightest seal feed tool on the market, and the most versatile. You don't have to mount it in a fixed position. Take it anywhere in the plant.

$ Light weight lets you use the SFC as easily on the sides of the package as on the top. (Anybody know of an overhead strapping application?)

$ The short base and centered balance of the SFC makes it easy to use on small packages, on cleats or other narrow surfaces, or on the edge of a box.

$ The SFC can be used with the strap dispenser either in front or behind the operator—whichever fits your layout best.

$ With all its advantages, the SFC is the *lowest cost seal feed tool* on the market.

First in steel strapping

You will like the SFC. It is a rugged, high-quality tool. See and try it. No obligation. Call the Signode man near you, or write:

SIGNODE STEEL STRAPPING CO.

2663 N. Western Avenue, Chicago 47, Illinois

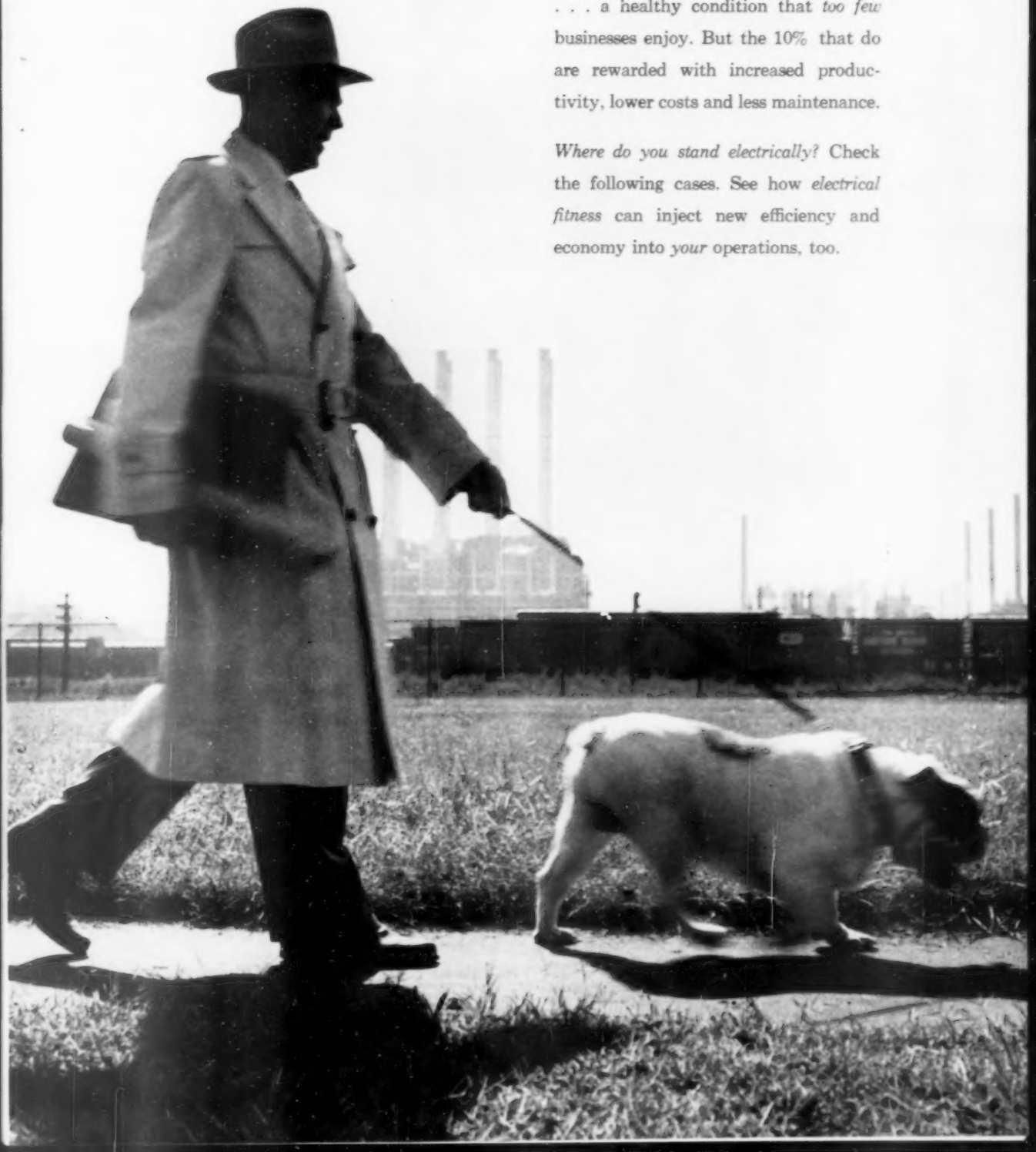
Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

For more facts circle 480 on Reader Service Card

ELECTRICAL FITNESS

. . . a healthy condition that *too few* businesses enjoy. But the 10% that do are rewarded with increased productivity, lower costs and less maintenance.

Where do you stand electrically? Check the following cases. See how *electrical fitness* can inject new efficiency and economy into *your* operations, too.



Is your business electrically fit?

It *is,* if your electrical system can keep pace with modern machines and other severe electrical demands. It *is not* if you are plagued with excessive maintenance, work-stopping current outage or an inability to relocate equipment quickly without costly electrical rewiring.

On these pages are examples of electrical fitness the BullDog way. Read how it insures dollars and sense results.

Power on wheels...and on tap

BullDog Industrial Trol-E-Duct® brings *mobile* power to the production line . . . feeds trolleys that roll with the job—*or right to it!* New production units are powered by merely inserting new trolleys. Equipment works full time while production rolls smoothly.

Universal Lighting Duct® proves the easy answer to all lighting needs . . . can't be beaten for flexibility, either. Available in 20- and 50-amp capacity, Universal Duct both *feeds* and *supports* lights and small power tools. Fixtures twist in at any spot, can be moved and relocated in seconds. New 20-amp Lighting Duct requires no supplementary fusing. Both offer top lighting mobility at remarkably low cost.

BULLDOG

KROGER—CINCINNATI, OHIO

Safety is a certainty

BullDog puts safety *first*. Duo-Guard Pushmatics® in Electri-Center® panels (pictured) provide *over-all* circuit protection . . . protect circuits *thermally* and magnetically. Unique Vacu-Break® arc control in BullDog Safety Switches smothers arcs instantly . . . minimizes burning and pitting. Another first, Clampmatic® control in BullDog switchboards, panelboards, safety switches and Vacu-Break bus plugs, brings bolt-tight electrical contact and accelerated break. Compact Cordon* breakers in BullDog Unit Substations combine the advantages of thermal magnetic breakers with current-limiting characteristics of Amp-traps**. . . offer greater protection at less cost.

**Trademark registered by I-T-E Circuit Breaker Company.*
***Trademark registered by Chase-Shawmut Company.*

RCA—MOORESTOWN, NEW JERSEY

New circuits in seconds plus low-cost power

As power goes, so goes production. At RCA, BullDog BUStribution® Duct smooths kinks in *both* . . . assures absolute electrical flexibility. Lo-X® Duct distributes power with greatest efficiency, while Plug-In® Duct slims electrical costs of moving and adding machinery by as much as 47%. New circuits plug into power in seconds—without rewiring or electrical downtime.

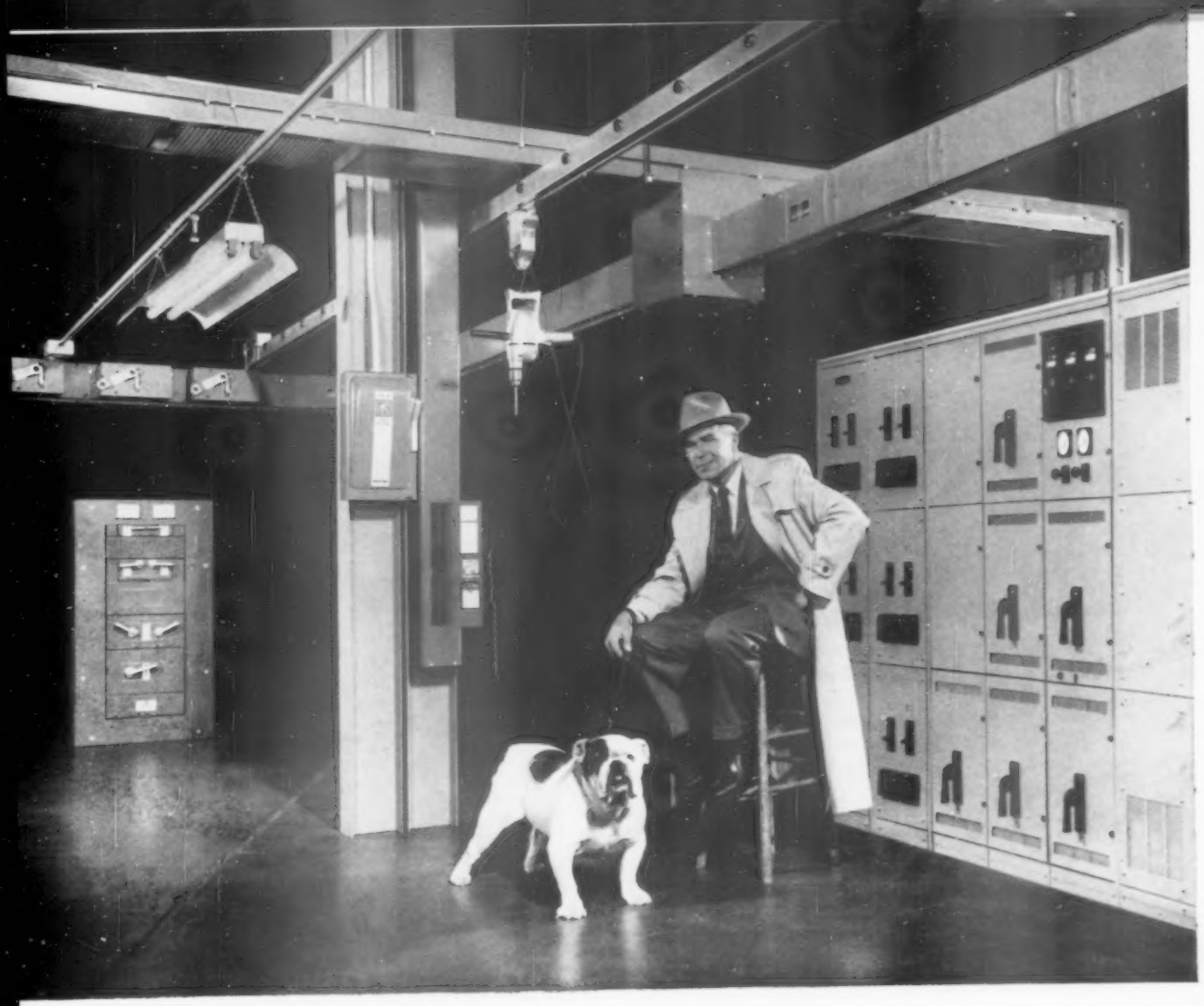
The entire system can be easily expanded or completely relocated to meet changing power needs. Pioneered by BullDog, lightweight aluminum BUStribution Duct cuts handling and installation costs . . . trims maintenance to the bone.

HALLMARK—KANSAS CITY, MISSOURI

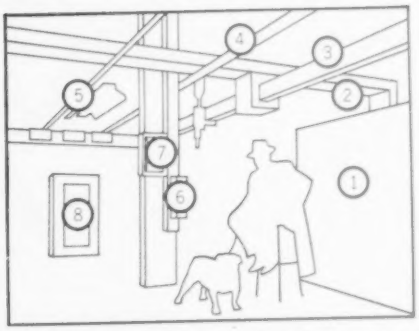
Powered up to meet the future

◄—Hallmark is electrically fit. Its BullDog secondary distribution system will *keep* this new plant modern, too. BullDog Unit Substations, Power Panels and other switchgear not only serve *today's* needs best and most economically, but facilitate almost instant power expansion. Interchangeable switch units in BullDog Switchboards, for example, are available in a wide range of ratings. They can be quickly changed or new units can be easily added when electrical requirements change. Expandability like this keeps power ready, willing and *able—whatever* the future demands.

For more facts circle 481 on Reader Service Card



Electrical Fitness—*your key to efficiency and economy, too!*



PLANNED POWER on display—it's yours in a system of coordinated BullDog components. 1. Unit Substation and Unit-Versal® Switchboards. 2. Lo-X® Feeder Duct. 3. Plug-in® Duct. 4. Industrial Trol-E-Duct®. 5. Universal Lighting Duct. 6. Pushmatic Electri-Centers®. 7. Clampmatic® Safety Switches. 8. Power Panels.

Don't let power problems get your business down. Look to BullDog for know-how and equipment to most effectively serve all your lighting and power loads. No better time than now to call your BullDog field engineer. He'll analyze your particular needs . . . study existing facilities . . . outline the *best and most economical* way to put your business in top electrical shape *and keep it there.*

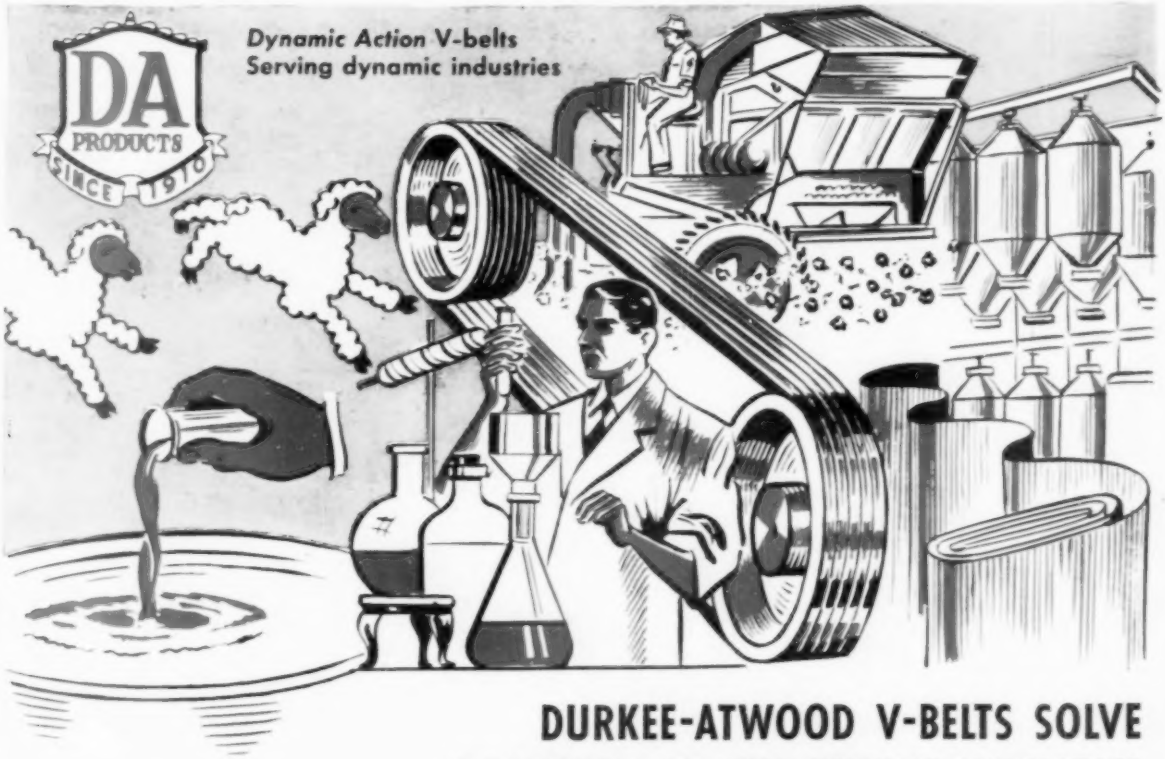
On a complete secondary distribution system or the smallest part—on unit substation or simple circuit breaker—BullDog engineering certifies efficiency, economy, safety. Consult your electrical contractor or BullDog field engineer or write direct.

© BEPCO

BULLDOG

BullDog Electric Products Company, Division of I-T-E Circuit Breaker Company, Detroit 32, Mich. *BullDog Export Division:* 13 East 40th St., New York 16, N.Y. *In Canada:* BullDog Electric Products Co. (Canada) Ltd., 80 Clayson Rd., Toronto 15, Ont.

HEAT BETTER ELECTRICALLY

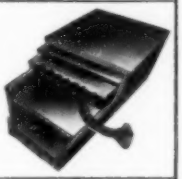


DURKEE-ATWOOD V-BELTS SOLVE PROBLEMS IN THE TEXTILE INDUSTRY

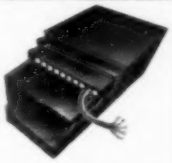
DURKEE ATWOOD V-BELTS — *a complete line serving industry*

MULTIPLE V-BELTS
Standard Line for normal loads.
Premium Line with 40% extra capacity for high loads.

STEEL CABLE V-BELTS
A complete line of steel cable reinforced V-belts.



GENERAL DUTY V-BELTS
Power-balanced construction for maximum flexibility, durability and strength.



DOR-TITE
for weather proofing . . . sound proofing . . . draft stopping, etc.

SPONGE RUBBER
for cushions . . . gaskets . . . mounting pads, etc.

Efficient power transmission is essential to the textile industry. That's why V-belts are used in so many different applications . . . such as in driving winders, warpers, spoolers, drawing frames, hosiery machines, fulling mills, shoddy mills, dryers and tenter frames, etc . . . to achieve top production.

Durkee-Atwood *Dynamic Action* V-belts solve problems in the textile industry.

When smooth, vibrationless drive is missing from regular belts . . .

When load requirements call for additional regular belts and increased sheave costs . . .

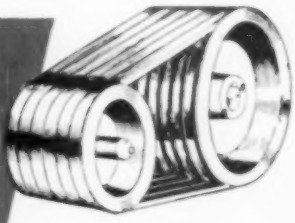
When oil robs standard belts of life . . .

When unusual temperatures limit total power transmission with regular belts . . .

. . . when these and other problems of the textile industry give you trouble then you'll appreciate how the complete line of Durkee-Atwood Standard, Hyload (Premium) and Steel Cable V-belts can boost your production schedules.

Durkee-Atwood engineers apply field-tested formulas with special synthetic rubber compounds and special fibres or steel cables to provide the right belts for your needs. Let Durkee-Atwood help *you*.

DURKEE ATWOOD COMPANY

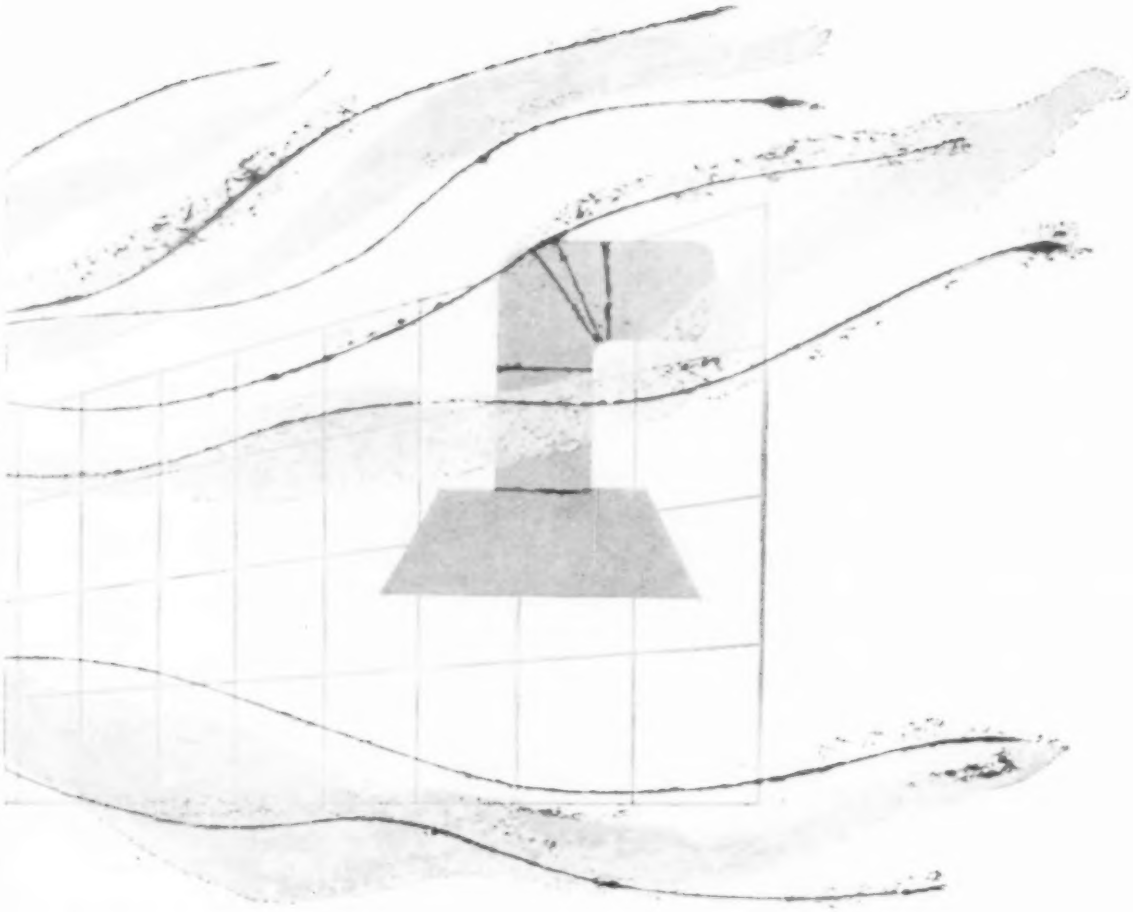


FEderal 2-0441 **Minneapolis 13, Minn.**

For more facts circle 482 on Reader Service Card

Another insurance "extra" from friendly **A**merican **M**utual men . . .

This friendly **AM** man



helps guard employee health by detecting hidden hazards in factory air!

By helping control toxic gases and dusts in plants, the AM Industrial Hygienist keeps employees healthier, production lines flowing.

Just recently, he got a rush call from a policyholder whose new process for bleaching was giving off irritant fumes. Using scientific tests and ingenious detective work, he tracked down the gas from several "suspects." A properly designed ventilating system quickly solved the problem—and the manufacturer went into full production without losing a day's time!

The Industrial Hygienist is one of many AM men who help set up loss control programs that save lives and limbs—and cut production costs. The rewards to AM policyholders in many fields: better employee morale, fewer production interruptions, greater savings through lower insurance premiums, plus dividends.* See your *friendly* AM *man* now! American Mutual, Dept. FM-2, 142 Berkeley St., Boston 16, Mass.

***Fafnir Bearing Co.,** another AM policyholder, saved $363,274 in 7 years through lower insurance costs due to good safety experience—plus substantial dividends!

American Mutual

LIABILITY INSURANCE COMPANY

Your friendly AM man can advise you on all your liability insurance needs

Leading writers of Workmen's Compensation, all forms of Liability, Crime, Accident and Health Insurance

For more facts circle 483 on Reader Service Card

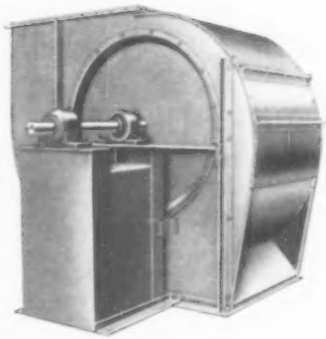
CLARAGE FANS FOR YOUR INDUSTRIAL AIR TRAVEL

Blowers and exhausters for diversified industrial applications.

Standard models promptly available.

Clarage builds air handling and conditioning equipment exclusively — concentrated know-how!

When you want equipment designed and built for "the long pull"— to stretch your equipment dollar to the utmost — call on CLARAGE FAN COMPANY, Kalamazoo, Mich.



CLARAGE ... *dependable equipment for making air your servant*

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

For more facts circle 484 on Reader Service Card

For more facts circle 485 on Reader Service Card ➤

DOW CORNING CORPORATION

Silicone News

PRODUCTION & MAINTENANCE EDITION NO. 22

NOW: END GREASE FAILURES

Lubricating "hot spots" is a problem most plants are faced with sooner or later. How well you solve this stickler when next you're confronted with it may depend on your knowledge of the newer lubricants, and the extraordinary heat resistance they possess. Here's a typical trial-and-success story.

Panelyte Division of St. Regis Paper Company, in Kalamazoo, manufactures decorative plastic laminates. In the process, many separate panels of laminate are stacked together into "books" for curing under pressure. Because each book weighs as much as 1500 pounds, and sixteen are cured at a time, the steel plates holding the books must be greased so an electric ram can move them.

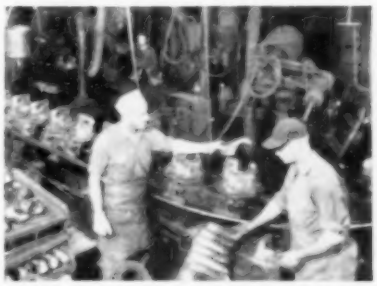
Ordinary lubricants tried by Panelyte didn't work. During the 90 minute, 360 F curing cycle, these petroleum-base materials dried up or melted away. In addition, they left a carbonized residue which tended to contaminate the laminates. Ram motor requirements rose as much as 2½ times, from 20 to 50 amps, and mechanical breakdowns in the ram occurred as often as once a week . . . each breakdown causing 4 to 12 hours lost production.

Then Panelyte learned of Dow Corning 44 Grease, the silicone lubricant. This new type heat-stable grease did the job. Cut with kerosene and placed in a roller pan, the silicone lubricant deposited a thin film on each steel plate that passed over it. And this film was enough: drive motor requirement dropped back to 20 amps! Since late 1956, Dow Corning 44 Grease has been in constant use, and work stoppages due to grease failure have ended! *No. 227*

Break Foam Bottlenecks

Would you believe that elimination of foam could speed a plant operation by 400%? Sounds incredible but it's true . . . that's how serious a problem foam can be.

For instance, a large producer of limed rosins had a terrific amount of foam during the lime and rosin reaction. So this firm began adding a teaspoon of Antifoam A, a Dow Corning silicone defoamer, to each 2,000 gallon kettle. That's a concentration of only 1 part silicone to 1½ *million* parts of reactant. Yet Antifoam A is so effective that foam disappeared at once. For this company, kettle capacity has been freed to the extent that processing time is cut from 6 hours down to 90 minutes . . . a 400% increase in production! *No. 228*



MOTOR SURVIVES FIRE

Situation: fire! Result: all motors but one burned out. Question: why not the one?

Industrial Stamping in Detroit employs a conveyor arrangement to buff auto bumper guards. The buffing line consists of polishing wheels driven by a total of 24 motors. Very efficient. But there's a problem: the buffing compound is highly flammable. Several spot fires have occurred.

Back in 1954, a blaze got started that swept the whole line. Only one motor survived. All the rest had to be rebuilt. Why the one? Turns out it had been previously rewound with Dow Corning silicone insulation. Being exceptionally heat resistant, the silicones weren't hurt a bit. The motor was simply cleaned up, checked out, and put back in service. It's still running fine today! Needless to say, Industrial Stamping is sold on silicone rewinds for vital production and service motors.

Thought: Excessive heat "kills" ordinary insulation. Are you using silicone insulation to get longer life and greater reliability from motors in "hot" spots? *No. 229*

FOR DATA RELATING TO THESE ARTICLES, CIRCLE REFERENCE NUMBER IN COUPON ON NEXT PAGE

MORE

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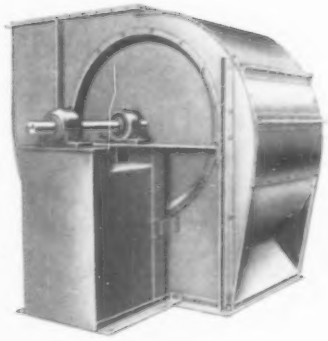

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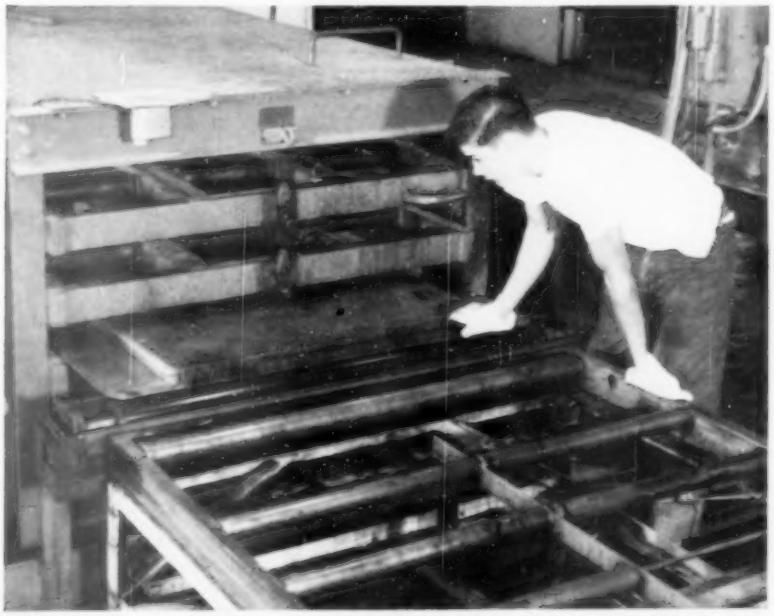

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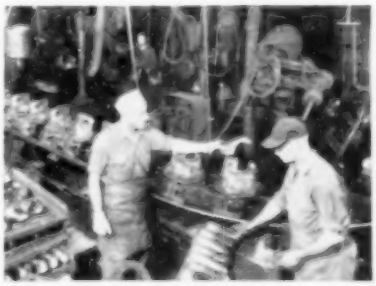

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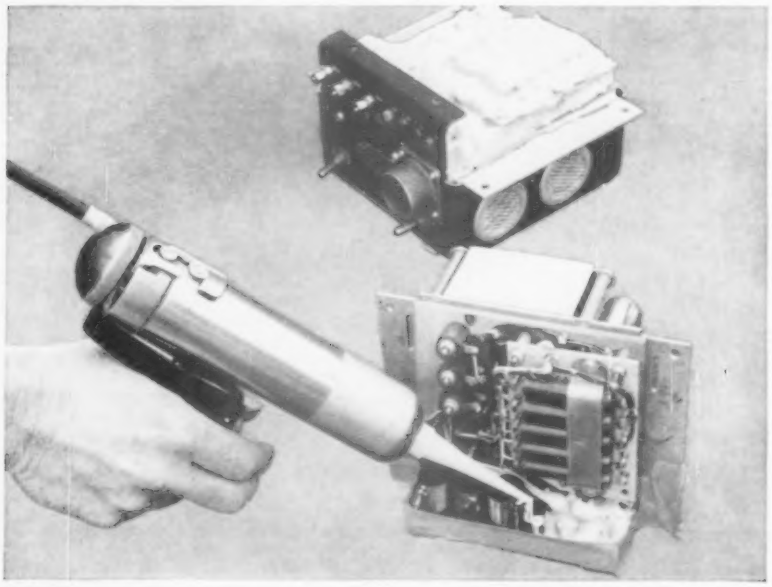


YOUR NEXT FIX-IT MATERIAL

Ever find yourself wishing you could make a rubber part for some plant unit, right on the spot? Rubber can do countless jobs, but often you can't get the right rubber part without delay. If you've ever been in this situation, there's good news for you.

Now, a new do-it-yourself material has been developed. It's Silastic* RTV 501, the Dow Corning silicone rubber that vulcanizes at room temperature. Supplied as a fluid plus an activator, Silastic RTV 501 can be applied by calking gun or molded by hand into any given shape. After activator and fluid are mixed, the material has a working time of three hours at normal room temperature. It sets up to a firm elastic rubber in 24 hours.

And there's more to the story. Not only does Silastic RTV 501 allow you to shape rubber parts yourself, it also has other exceptional properties. Being a silicone rubber, it possesses great heat resistance . . . withstands temperatures up to 500°F, and as low as −70°F. Moisture resistance is excellent and so are electrical properties. You can use it in very hot, cold, or wet locations, or as an electrical insulator.

Silastic RTV 501 is a fine material for seals, washers, gaskets, jackets, coverings for electrical parts or connections, flexible molds, cushioning pads, vibration and shock mounts, waterproof coatings, calking strips and countless other components.

It's the answer to all kinds of maintenance problems! *No. 230*

TYPICAL PROPERTIES OF SILASTIC RTV 501

Color	light tan
Consistency	fluid
† Tensile Strength, psi	230
† Elongation, %	250
Water Absorption, % max.	1

* T.M. REG. U.S. PAT. OFF.

† 24 HOURS AT ROOM TEMPERATURE

NEW LITERATURE AND TECHNICAL DATA ON SILICONES

How To Cut Maintenance Costs with Silicones, reprinted from ELECTRIC LIGHT & POWER, tells how silicones are used by utility engineers and power distribution maintenance people to make a number of everyday chores easier. *No. 231*

Protective Finishes and Maintenance Paints made with Dow Corning Silicones resist heat, moisture, weathering. Four page brochure describes silicone finishes and lists more than 50 sources. *No. 232*

Protect Masonry with water repellents based on Dow Corning Silicones. Give lasting protection to above-grade block, brick, concrete, stone, stucco and many other surfaces. These silicone treatments are easily applied and do not discolor. They help keep masonry clean by keeping water out — reducing efflorescence, cracking and spalling. Descriptive brochure containing complete information is available now. *No. 233*

Pressure-Sensitive Silicone Tapes stick to wet or dry surfaces, form good bonds, have high dielectric strength, repel moisture, are not affected by corrosive chemicals. All described in a new fact-filled folder designed to help you choose the type of tape best suited to your application. *No. 234*

New Silicone Coating for paper and paperboard keeps gummy and tacky materials from sticking to all types of bags, boxes, inner liners, wraps and interleaving sheets. Will not migrate; will not contaminate materials that come in contact with it. New brochure containing sample papers describes how Silicone Coating aids packagers and processors of sticky products. *No. 235*

Shell Molding with silicone parting agents is described in an illustrated "how-to-do" brochure. Included are recommendations for cleaning and breaking-in patterns, and suggestions for obtaining easy release of sand-resin shells of high dimensional accuracy. *No. 236*

Dow Corning Corporation, Dept. 514, Midland, Michigan

Please send me: 227 228 229 230 231 232 233 234 235 236

NAME _____

TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE ____ STATE _____

SILICONE NEWS is published for production and maintenance men by

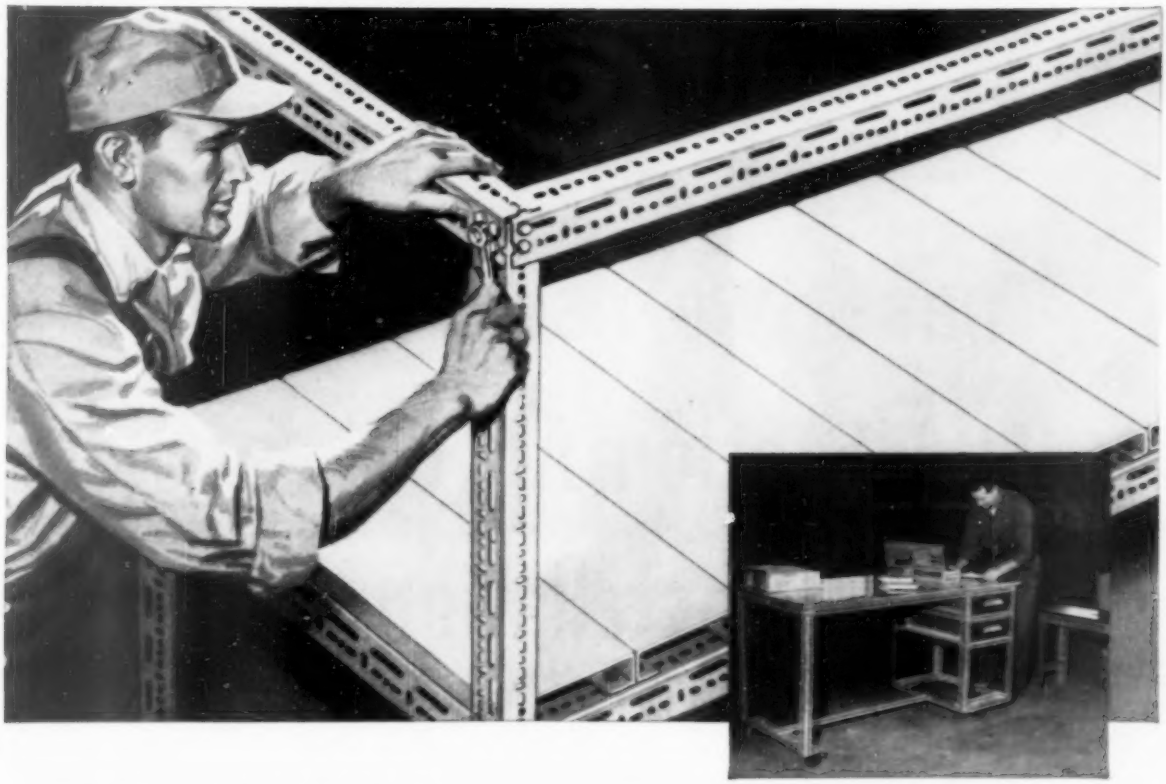
first in silicones

Dow Corning CORPORATION

MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D. C.

CANADA: DOW CORNING SILICONES LTD., TORONTO GREAT BRITAIN: MIDLAND SILICONES LTD., LONDON FRANCE: ST. GOBAIN, PARIS



Moveable Shop Desk

Bolt together ideas!...

Build to your specifications with

ACME STEEL Dexion Slotted Angle

DEXION Slotted Angle, the Idea material, is merely cut and bolted together to fill whatever ideas you may have for uses of framing material. Its utility is as broad as your imagination, and it requires no special skills for assembly. The only tools needed are a wrench and a DEXION cutter to build whatever ruggedly strong, economical and useful equipment you desire for your plant, warehouse or store.

Merely measure DEXION by counting cutting marks spaced every three inches. Then cut with an easy stroke of a clean-shearing DEXION Cutter. Carefully engineered DEXION slot and hole pattern matches up to make assembly easy, true and strong. And you simply bolt the pieces together to assemble whatever structure your good ideas have led you to erect.

You can obtain DEXION Slotted Angle in easy-to-handle packages of ten galvanized, cold rolled steel pieces in 10 or 12 foot lengths. And nuts and bolts are included. DEXION has two sizes: 3" x 1½" x .104" and 2¼" x 1½" x .080".

There are strong DEXION Panels available for shelving, table tops, or any decking you may want to apply to your DEXION framed structure. Special DEXION Casters will add mobility, if you desire.

FREE Acme Steel Dexion Idea Book—It contains scores of Dexion ideas-in-use. See what others have created in practical, low-cost equipment. To start your ideas rolling, get your copy now. Write to Dept. FAD-48. Dexion Division, Acme Steel Company, Chicago 27, Illinois. We'll send the book plus the name of your nearest Dexion office or distributor.

Storage Racks

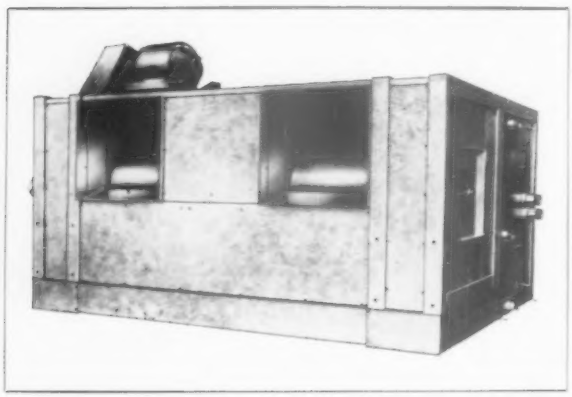
Shelving

ACME STEEL DEXION SLOTTED ANGLE

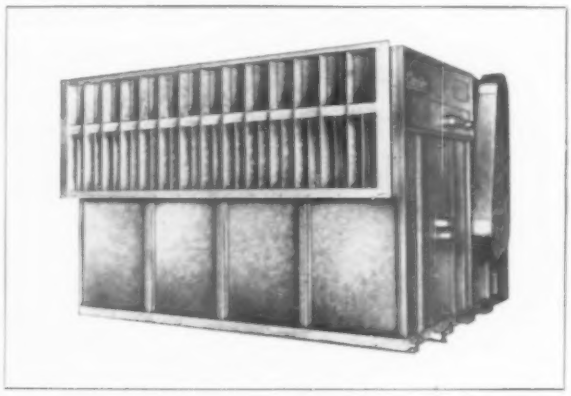
For more facts circle 486 on Reader Service Card

These two new Carrier Central Station Air Conditioners will cut installation costs!

Today, tomorrow or the day after, someone in your organization may be face to face with the sizable cost of building an outside room to house air conditioning equipment. Now Carrier eliminates this expense with these two new fan-coil air conditioners. They're so compact they fit into spaces inside your building, where others cannot go. Ceiling suspended models are so shallow they allow room below for a compressor, conserve valuable floor space. They cut piping costs, too—connections are all on one side or the other. Full horizontal or full vertical air discharge solves location headaches. Class I fans handle space-saving, higher velocity duct systems. Cooling and heating capacity requirements can be closely matched. And availability of larger sizes often makes one unit do the work of two. For your copy of the 72-page catalog that gives complete technical data, phone your nearest Carrier office. Or write Carrier Corporation, Syracuse, New York.



39AC SYSTEM WEATHERMAKERS for conventional central station applications. Building block construction for easy field handling. For use with direct expansion, chilled water or brine cooling systems; steam or hot water heating systems. In eight sizes, from 3000 to 41,000 cfm and air velocities up to 700 fpm.



39W ZONING WEATHERMAKERS for simultaneous independent cooling and heating of up to 14 different zones or rooms. For use with direct expansion, chilled water or brine cooling; steam or hot water heating. Zoning Weathermakers are available in eight sizes, from 3000 to 35,000 cfm and air velocities up to 600 fpm.

For more facts circle 487 on Reader Service Card

Protective covering textiles & roll goods. (Photo courtesy of Industrial Rayon Corp.)

Protection for products requiring spiral wrap. (Photo courtesy The Goodyear Tire & Rubber Co.)

Flexible covering for furniture and other odd shaped products. (Photo courtesy of Furniture City Upholstery Co.)

Protecting open shipments in transit. (Courtesy Pine Mountain Lumber Co.)

Want a Product Wrap that's Low Cost... Waterproof... and Amazingly Rugged?

Indoors or outdoors, **FIBREEN INDUSTRIAL PACKAGING PAPERS** provide low-cost protection for large products and small, odd shaped and even shaped, crated or in boxes.

Available in asphalt and non-asphalt laminates, flat and creped krafts, many strengths and widths.

Write our main office at Attleboro, Massachusetts for name of nearest FIBREEN jobber, sample and helpful packaging booklet.

AMERICAN SISALKRAFT CORPORATION

Chicago 6 • New York 17 • San Francisco 5

Wrap it . . . Ship it . . . Store it in

FIBREEN !

In Canada contact Alexander Murray & Co., Ltd., Montreal.

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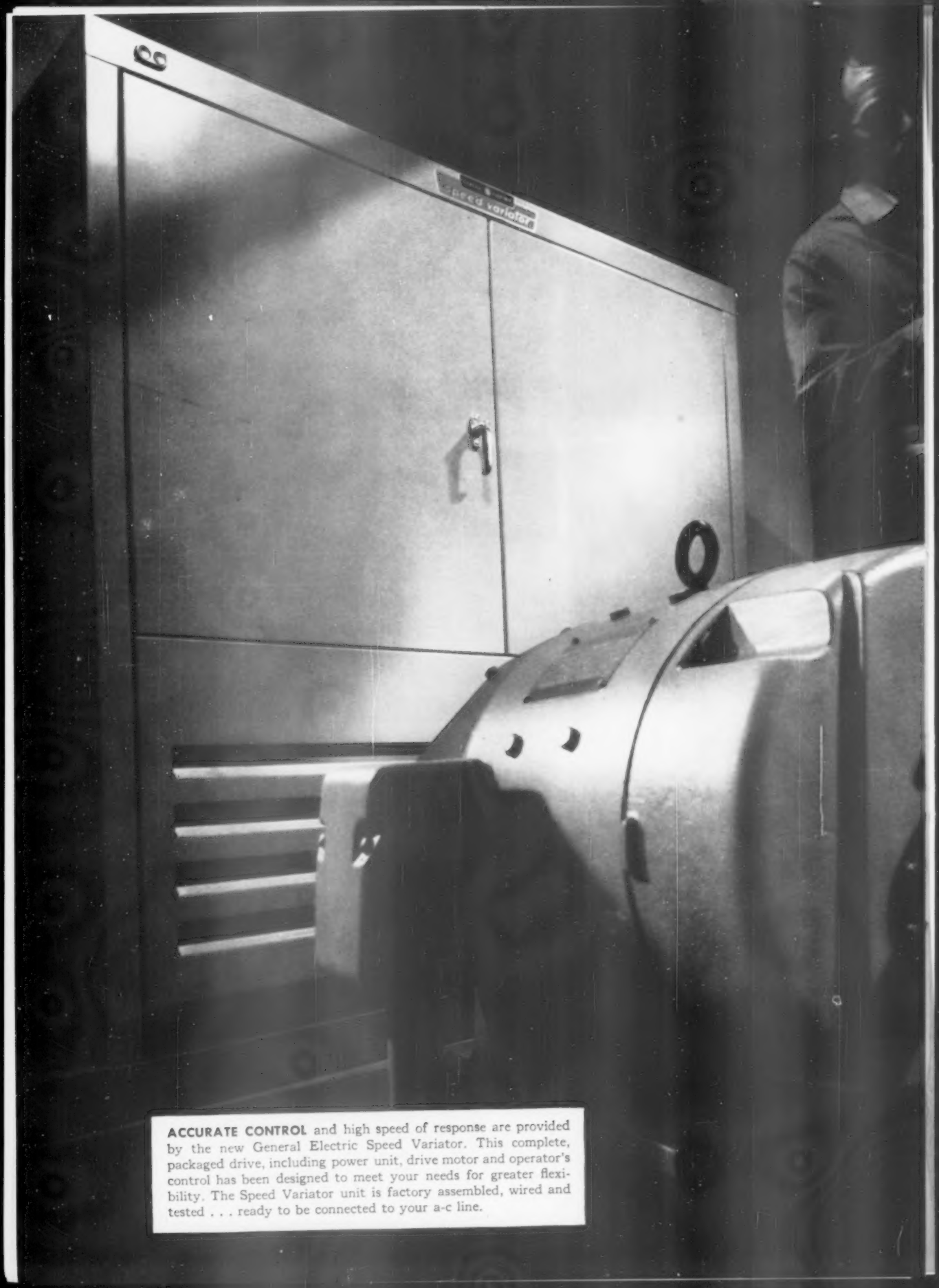
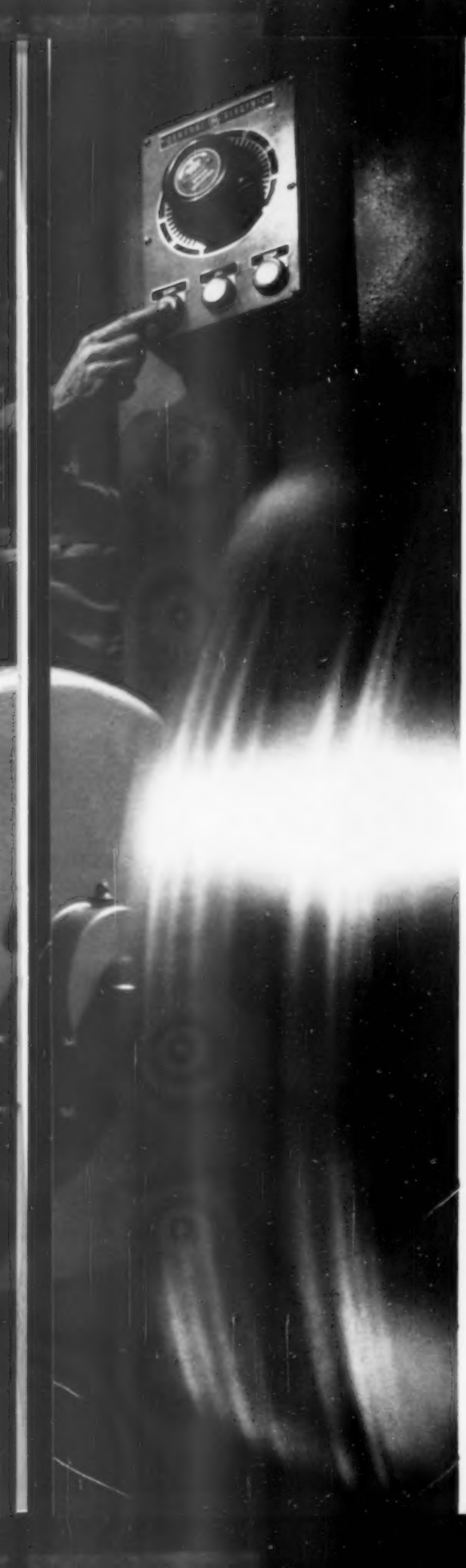


ACCURATE CONTROL and high speed of response are provided by the new General Electric Speed Variator. This complete, packaged drive, including power unit, drive motor and operator's control has been designed to meet your needs for greater flexibility. The Speed Variator unit is factory assembled, wired and tested . . . ready to be connected to your a-c line.



NEW

General Electric Speed Variator

An Adjustable-speed Drive with . . .

- Amplistat® Regulator
- Static Exciter
- Kinamatic* Drive Motors
- Silicon Rectifiers
- Two-Unit, Four-Bearing Motor-Generator Set

*Trademark of General Electric Company

See how the new Speed Variator cuts costs

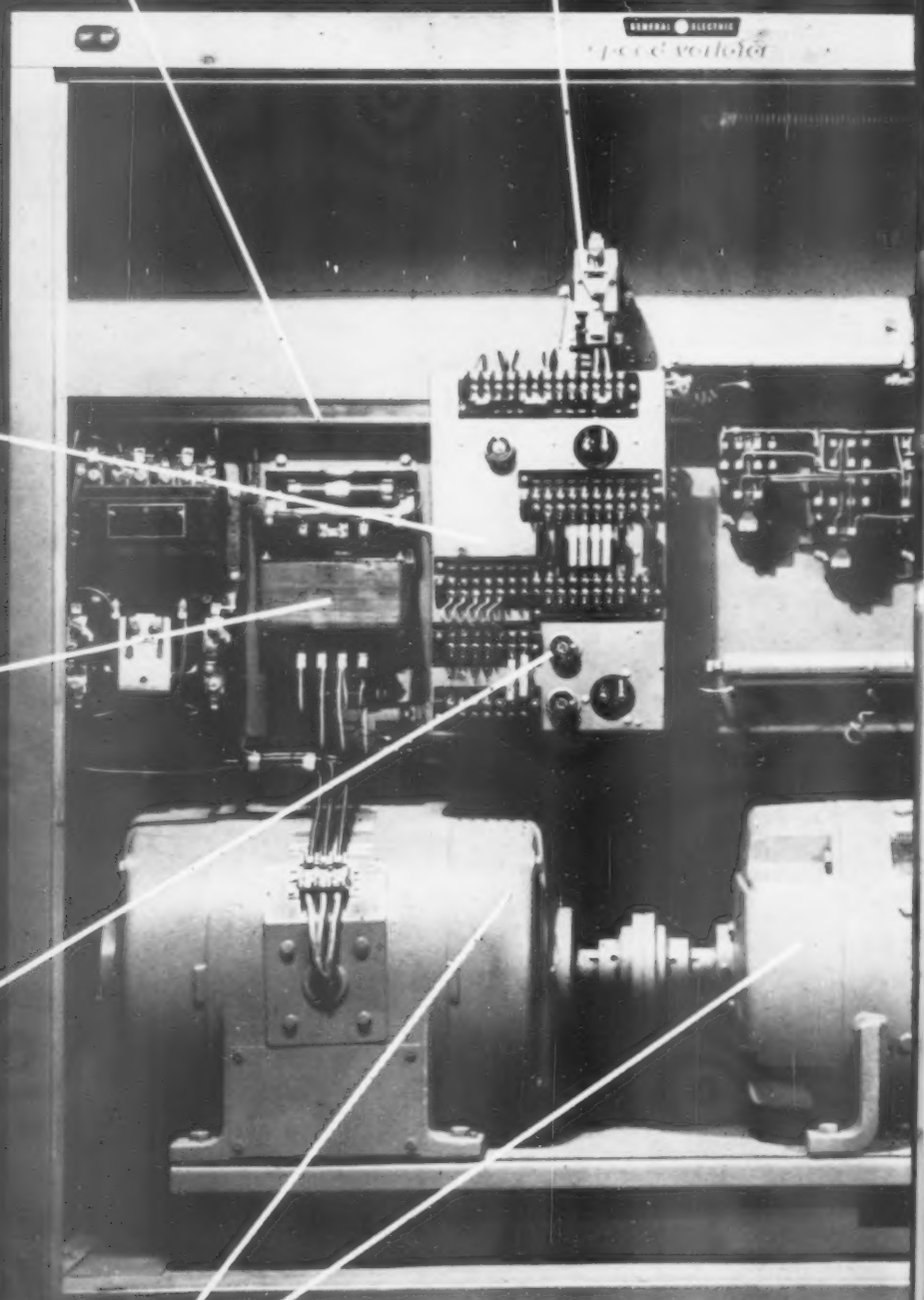
Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts circle 489 on Reader Service Card

RECESSED WIRING TROUGHS simplify installation and inspection. Permit back-to-back mounting of control panels when required.

FRONT-CONNECTED CONTROL COMPONENTS make servicing and replacement easy. Standard parts can be replaced from stock.



AMPLISTAT REGULATOR is standard equipment on new Speed Variator. It holds speed steady under varying loads . . . has no moving parts.

STATIC EXCITER permits immediate operation because it requires no warm-up time.

TIMED ACCELERATION AND DECELERATION permits smooth, controlled starts by means of simple potentiometer knob adjustment.

TWO-UNIT, FOUR-BEARING MOTOR-GENERATOR SET features latest design Tri-Clad† '55' alternating-current motor and direct-current generator. In ratings 3 through 50 hp, set is mounted on base in which special openings have been provided so that it can be removed by fork truck.

KINAMATIC DRIVE MOTOR can handle greater momentary loads. It provides split-second response to control signals; more power per pound and greater versatility.

NEW

SPEED VARIATOR CUTS COSTS FOUR WAYS

1. NEW AMPLISTAT REGULATOR AND STATIC EXCITER have no moving parts. Maintenance of these components is virtually eliminated.

2. LONG-LIFE SILICON RECTIFIERS are used in both regulator and exciter. Silicon offers high standards of reliability and exceptional long-life characteristics.

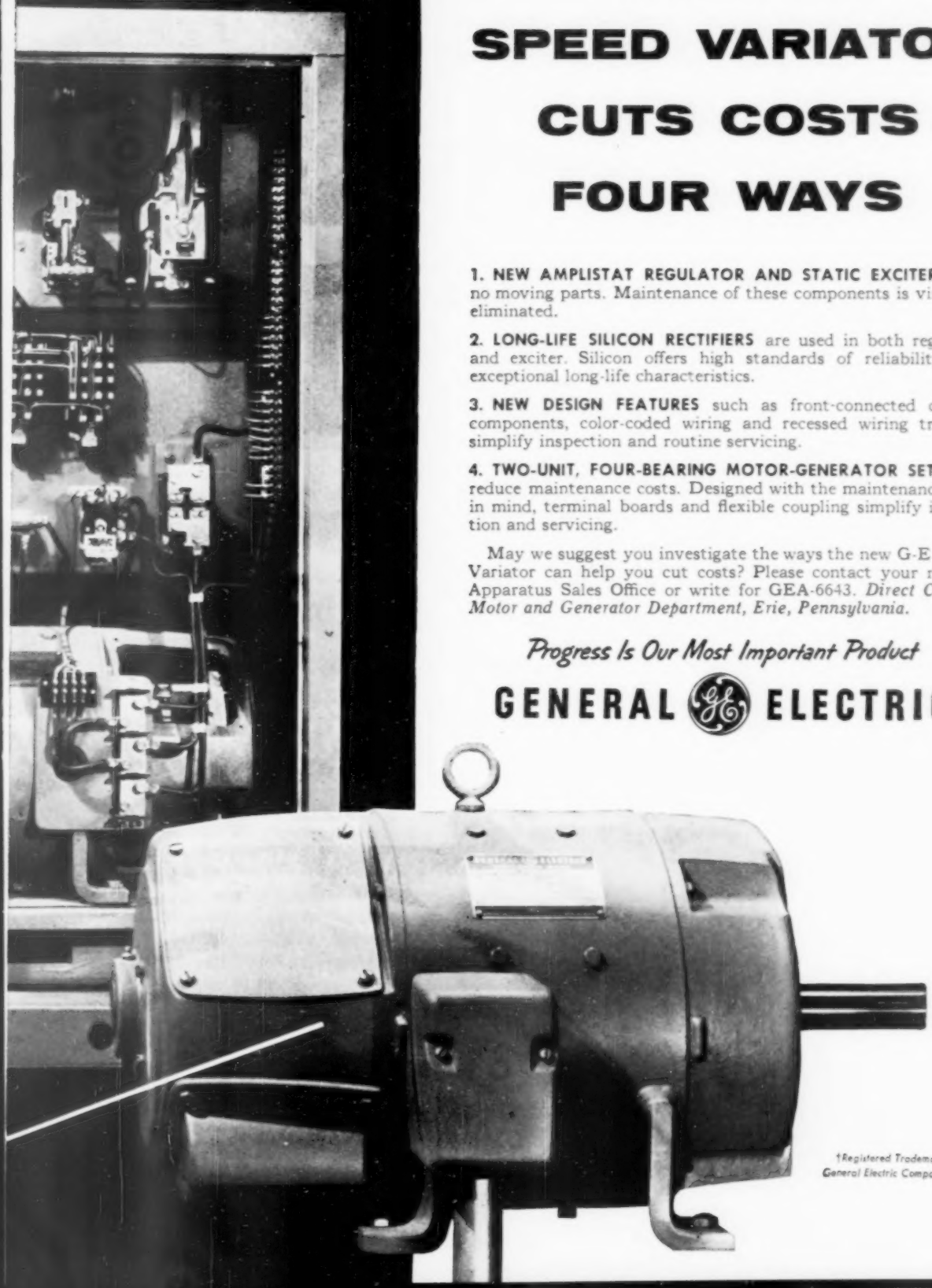
3. NEW DESIGN FEATURES such as front-connected control components, color-coded wiring and recessed wiring troughs, simplify inspection and routine servicing.

4. TWO-UNIT, FOUR-BEARING MOTOR-GENERATOR SET helps reduce maintenance costs. Designed with the maintenance man in mind, terminal boards and flexible coupling simplify inspection and servicing.

May we suggest you investigate the ways the new G-E Speed Variator can help you cut costs? Please contact your nearest Apparatus Sales Office or write for GEA-6643. *Direct Current Motor and Generator Department, Erie, Pennsylvania.* 8L3-14

Progress Is Our Most Important Product

GENERAL ELECTRIC



†Registered Trademark
General Electric Company

BASIC MODEL

Model 600

One bench top (steel, Presdwood-covered steel, ShopTop or laminated wood), two sturdy steel bench legs, and one bench stringer.

Space Engineering with Standard Units

is a cost-reducing advantage of all HALLOWELL Shop Equipment

Typical installation of HALLOWELL open type work benches. They can be set up in continuous line, back to back or individually as required.

Outfitting plant areas with specially designed and built shop equipment is a costly, time-consuming operation. And the equipment lacks the versatility to meet changing conditions. Space engineering with standard HALLOWELL Shop Equipment overcomes all these disadvantages. Its cost is only a fraction that of custom built units. It is carried in stock by leading shop equipment dealers, is easy to order—and deliveries are excellent. It is extremely versatile. Standard HALLOWELL interchangeable accessories (drawers, drawer tiers, end pieces, backboards, top and lower shelves, utility cabinets, storage wall units and electrical panels) can be added as needed to increase the usefulness of this equipment. Units can be rearranged to meet changing requirements.

Ask the authorized dealer nearest you for complete information on the standard HALLOWELL line of work benches, shop desks, stools and chairs, tool stands, cabinets, storage walls, and shelving. Or write Hallowell Shop Equipment Division, STANDARD PRESSED STEEL Co., Jenkintown 11, Pa.

SPS Jenkintown • Pennsylvania

Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Columbia Steel Equipment Co. • National Machine Products Co. • Nutt-Shel Co. • SPS Western • Standco Canada Ltd. • Unbrako Socket Screw Co., Ltd.

For more facts circle 490 on Reader Service Card

Gulf Metalcoat A has protected this crane for 4 years—working above sulfuric acid pickling tanks! The coating is still in excellent condition.

Protect metal against corrosion up to 10 times longer with

NEW GULF METALCOAT A

Brush, dip or spray metal surfaces with this revolutionary aluminum pigmented liquid coating. New Gulf Metalcoat A protects metal under the most severe exposures in marine and industrial atmospheres . . . and protects it over longer periods of time at lower cost. A 4-year salt spray test at Wrightsville Beach, N. C., proved that new Gulf Metalcoat A gave 7 to 10 times greater protection than competitive products!

Gulf Metalcoat A is recommended for piping, fences, machine parts, transportation equipment, ships, metal roofs, stacks—practically any type of steel structure.

It can be applied to rough or smooth surfaces, and the metal doesn't even have to be entirely rust-free before application! Temperature changes won't affect Gulf Metalcoat A. And it can be removed easily by a petroleum solvent, in those cases where only temporary protection is desired!

Your Gulf Sales Engineer can show you how much less it costs to protect against rust and corrosion with new Gulf Metalcoat A. Just call him, at the nearest Gulf office.

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

For more facts circle 491 on Reader Service Card

NATIONAL

Complete line of industrial seals –leather or synthetic rubber

National 50,000 series
Micro-Torc Leather Oil Seal

NATIONAL MICRO-TORC LEATHER SEALS

Revolutionary Micro-Torc seals, exclusively by National, offer low torque, high lubricity, no measurable leakage. They run cool, last longer than conventional leather seals, have the exclusive Micro-Torc sealing lip that "stores" oil for periods of temporary lubricant starvation. Wide variety of types and sizes.

Cross-section, National Micro-Torc sealing lip. Oil cannot pass through elastomer-coated side. Inner body retains natural porosity for "oil storage."

National 30,000-S series
Syntech Synthetic Rubber Oil Seal

NATIONAL SYNTECH® SYNTHETIC RUBBER SEALS

One of industry's most widely used seals. Ideal for higher speed, higher temperature applications. Available in a wide selection of types and sizes, including seals with rubber covered peripheries, spring-tensioned or spring-less, with twin or triple lips for special applications.

Cross-section, National Syntech sealing lip. Exclusive design insures low torque, yet provides positive sealing over long service life.

NATIONAL OIL SEALS

FEDERAL-MOGUL SERVICE
DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC.
DETROIT 13, MICHIGAN

4542

For more facts circle 492 on Reader Service Card

Top performers . . . big as 400 HP, small as 1/20 HP

Don't buy less motor than you need, nor more motor than you'll use. Specify Century . . . get exactly the right motors for your applications. Here's the *complete* line! An exceptionally wide range of types and sizes . . . all *top* performers.

Because they can be so carefully matched to your drive requirements, rugged Century motors give you even longer, more efficient service. And it's in the *long run*, especially, that your motor investment really pays off.

At Century you have a unified source and production capacity for all your electric motors up to 400 HP. Backed by *nationwide* supply and engineering service. Call your local Century man or Authorized Century Distributor.

Century MOTORS

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri • *Offices and Stock Points in Principal Cities*

For more facts circle 493 on Reader Service Card

Your best assurance of careful handling; fast, dependable service

Best Market Coverage

American offers service to more leading cities in the United States, Mexico and Canada than any other airline. Direct one-carrier service means greater speed enroute.

Most Frequent Schedules

American schedules the greatest number of departures—over 1000 daily! High frequency of flights assures fast forwarding and minimum terminal time.

Greatest Dependability

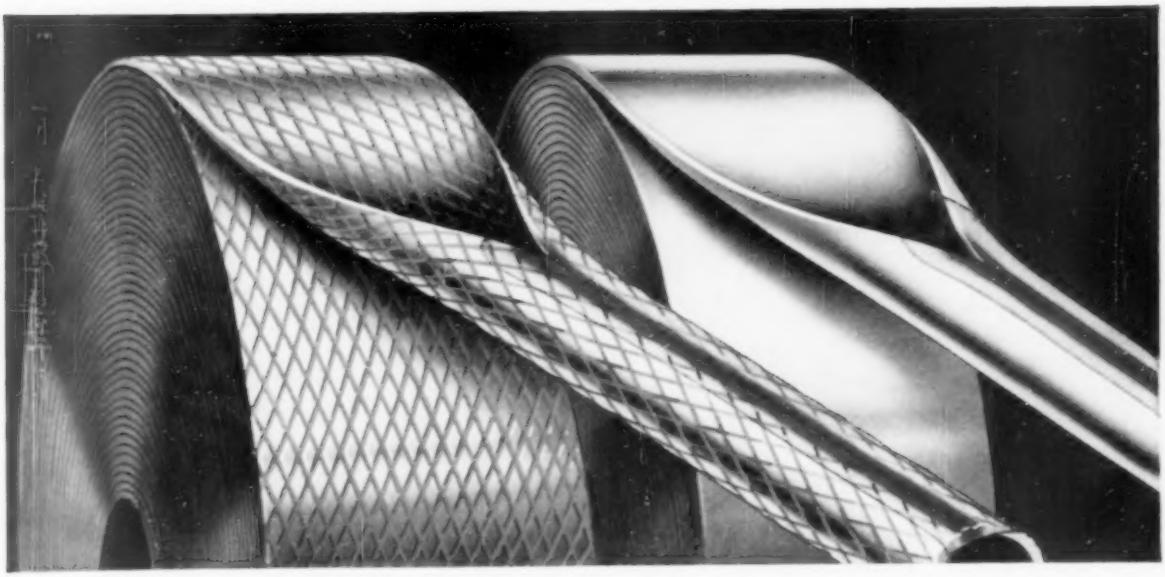
American has the largest, most experienced personnel force as well as the most modern cargo facilities. This superior know-how means careful handling and prompt service.

Space Assured

With a fleet of 207 modern aircraft, American Airlines Airfreight has more than enough capacity, to assure you of space when you need and where you need it most!

Now... Aluminum Tubing... plain or patterned...Welded

with TOCCO* *High-Frequency Heating*



Quaker State Metals Company, leading fabricator of aluminum building products, recently installed a 25 kw, 450,000 cycle TOCCOtron vacuum tube oscillator for continuous welding of aluminum tubing. Both plain and patterned strip, anodized or untreated according to end-use requirements, is continuously welded. Diameters vary from ½" to 1" O. D. and wall thicknesses from .024 to .064".

The weld is absolutely uniform throughout the entire length, assuring a dependable, strong bond. The whole operation is so smooth and quiet, you hardly know it's running.

Aside from the perfect weld, for the ultimate in product quality, TOCCO Induction Welding, being a completely automatic process, saves time and money over many conventional joining methods.

Remember, whether *your* products are of ferrous or non-ferrous metals, TOCCO can almost certainly save *you* time and money in heat-treating, brazing, welding, or hot forming operations.

TOCCO

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***Mail Coupon Today*— NEW FREE Bulletin**

The Ohio Crankshaft Co. • Dept. FF-4 Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating".

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State____

For more facts circle 495 on Reader Service Card

See What Square D's Front-Connected *POWER-STYLE* Switchboards Offer!

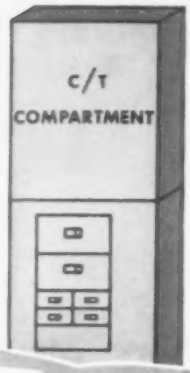
NEW!

First *completely standardized* switchboard built specifically for small and medium-size installations. Bus bars designed to assure *cool operation in a depth of 14 inches!*

Complete *front accessibility* allows all bus bars and branch circuit connections to be installed and removed *from the front!* Permits mounting directly against wall.

Off-center mounting of breakers (or QMB fusible switches) in right hand section provides maximum room for installing cables from larger units.

Standardized C/T compartment built to meet Edison Electric Institute and Public Utilities' specifications.



Completely standardized horizontal bussing is available up to 2000 amperes, at either top or bottom. Notice bus bar drillings for extension to future sections.

Standardized C/T compartment designed to provide most flexible arrangement. Available in either "hot" or "cold" sequence, top or bottom feed. When used without main disconnect in "hot" sequence, up to six subdivisions can be mounted in same section with C/T compartment.

Write for descriptive bulletin
Address Square D Company, 6060 Rivard Street, Detroit 11, Michigan

SQUARE D COMPANY

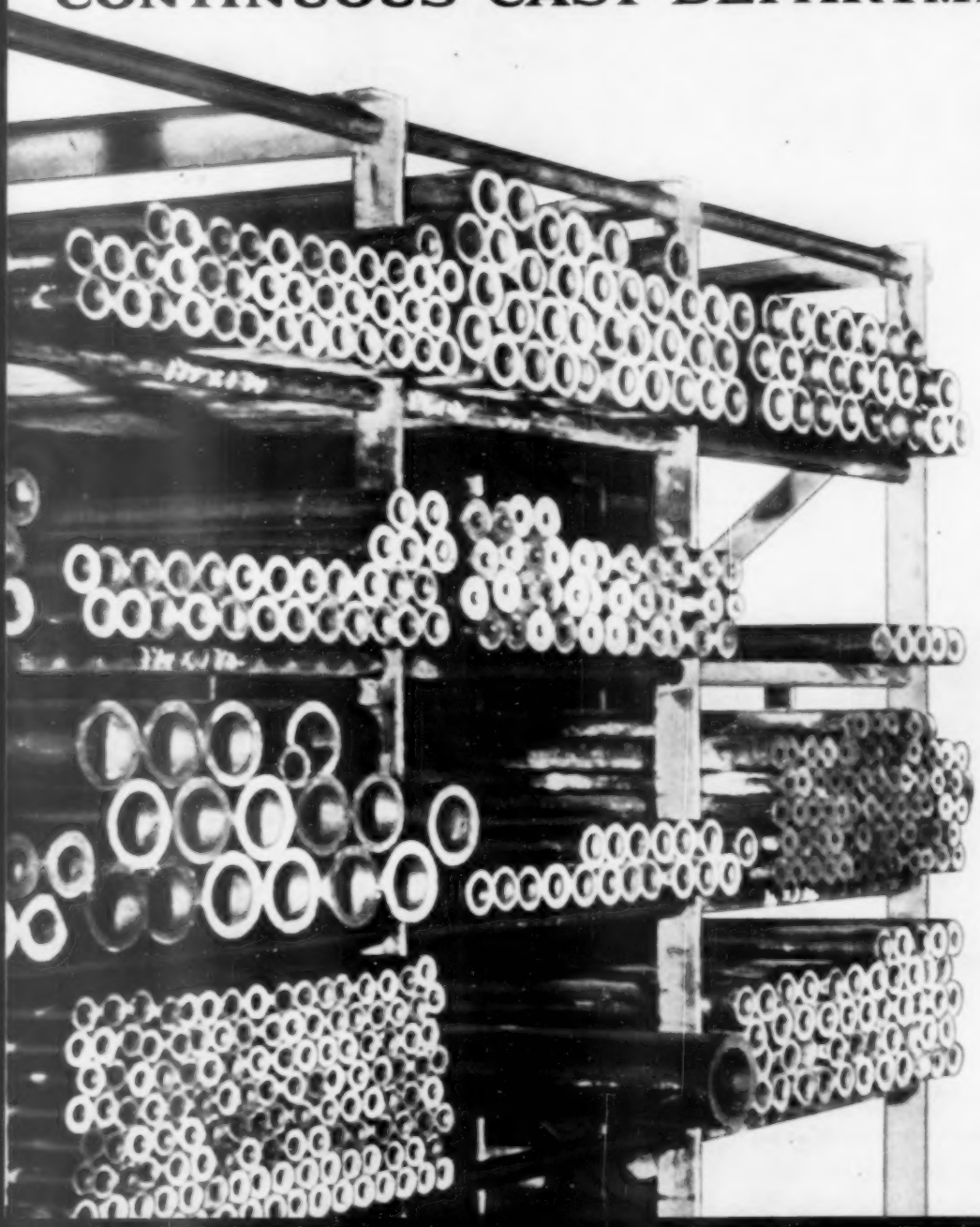
For more facts circle 496 on Reader Service Card

For more facts circle 497 on Reader Service Card ➤

Positive way to cut maintenance costs: Asarcon 773 continuous-cast bearing bronze. Asarcon 773 (SAE 660) in *exact lengths* you need. No more short-end scrap as from 13″ bars. No blow-holes, pits, shrinks. No hard or soft spots. *No sand to dull tools.* Yield, impact, and fatigue strength as much as twice that of same alloys cast by other methods. Result: *less downtime.* Order Asarcon 773 from stock in 260 sizes, solids and tubes, any length up to 105″, from a national network of distributors. Write for address of nearest stock point and complete data, to Continuous-Cast Products Department, American Smelting and Refining Company, Barber, N. J. West Coast agent: Kingwell Bros., Ltd., 457 Minna St., San Francisco. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

58-19

CONTINUOUS-CAST DEPARTMENT OF



ASARCO

AMERICAN SMELTING AND REFINING COMPANY

Free Demonstration Anywhere in Your Plant

See proof that the 'Budgit' Chain Block can cut your load handling costs

Be convinced — take us up on this free demonstration offer now.

Choose any plant area where lifting is a problem and a hoist can be hung. Then call your local 'Budgit' Distributor. See the yellow pages of your phone book — or write us for the name of the one nearby. He will bring and hang up a 'Budgit'. He will prove hoisting is an easy one-man job that frees manpower for other work.

'BUDGIT' SAVES TIME, ENERGY, MONEY

You will learn how only 25 lbs. of muscle effort can lift a 500 lb. load. You will see how fast the big, automatic load brake operates in spotting loads exactly where you want them. You will learn how light weight and strength are combined to produce a safe hoist that cuts lifting costs in emergencies, maintenance, construction, production.

All this and more are yours to see right in your own plant — without obligation.

'Budgit' Aluminum Chain Blocks are made in ¼ to 10-ton capacities, in top hook and Army-Type trolley styles. Spark and corrosion resistant models, too. Prices start at $125.

Call your Shaw-Box distributor today or ask us for Bulletins 15010-10, 15010-16, 15010-17, 15010-18.

Authorized service stations from coast to coast save time, trouble and money for every 'Budgit' user.

58C-2

MANNING MAXWELL & MOORE INC. M&M TRADE MARK

'Budgit'® CHAIN BLOCKS

MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

358 W. Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, and 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario*

BALL BEARING HANGER has self-aligning bearing and seal—adjusts to suit shaft deflection. Square tube member of frame is positioned to permit easy passage of materials.

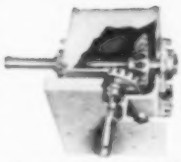
How new LINK-BELT screw conveyor components

reduce power demands and maintenance delays

QUIK-LINK CONVEYOR SCREW. For ease in removal of conveyor section without dismantling other components. Feature can be furnished on Helicoid and Sectional Flight Conveyors.

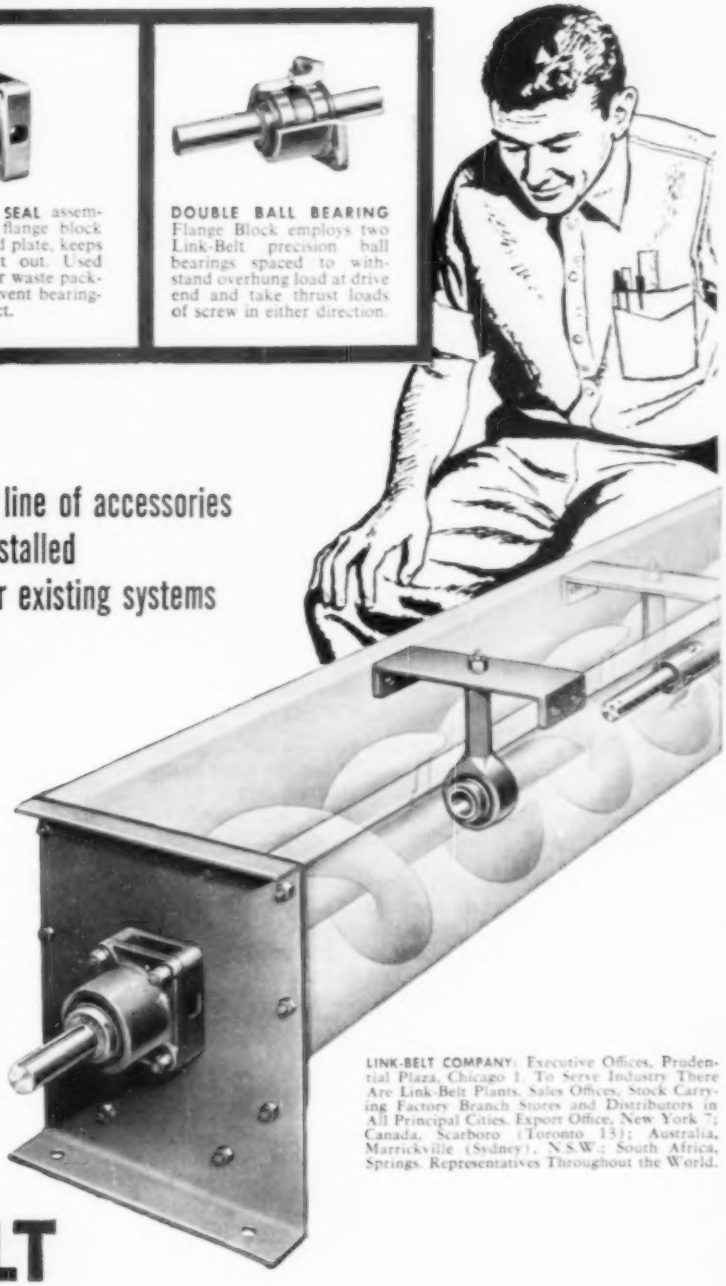
TROUGH END SEAL assembled between flange block and trough end plate, keeps grease in, dirt out. Used with lip, felt or waste packing seal to prevent bearing-product contact.

DOUBLE BALL BEARING Flange Block employs two Link-Belt precision ball bearings spaced to withstand overhung load at drive end and take thrust loads of screw in either direction.



BALL AND ROLLER BEARING COUNTERSHAFT END. For drives at right angles to screw conveyor or common drive for two conveyors intersecting at right angles—absorbs thrust.

Complete line of accessories can be installed on new or existing systems



THOUGH just recently introduced, these Link-Belt screw conveyor components have already achieved a wide acceptance. Throughout industry, they're cutting power and maintenance demands to a new low.

Design refinements include the Quik-Link conveyor screw that makes removal of conveyor section possible without dismantling other components. Starting and running friction is reduced through the use of Link-Belt ball bearing hangers, as well as new ball bearing trough ends. Trough ends can be furnished with seals to protect bearings—seals are rabbetted for perfect bearing alignment.

For facts, call your nearby Link-Belt office or authorized stock-carrying distributor. Or write for Folder 2489.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

LINK-BELT

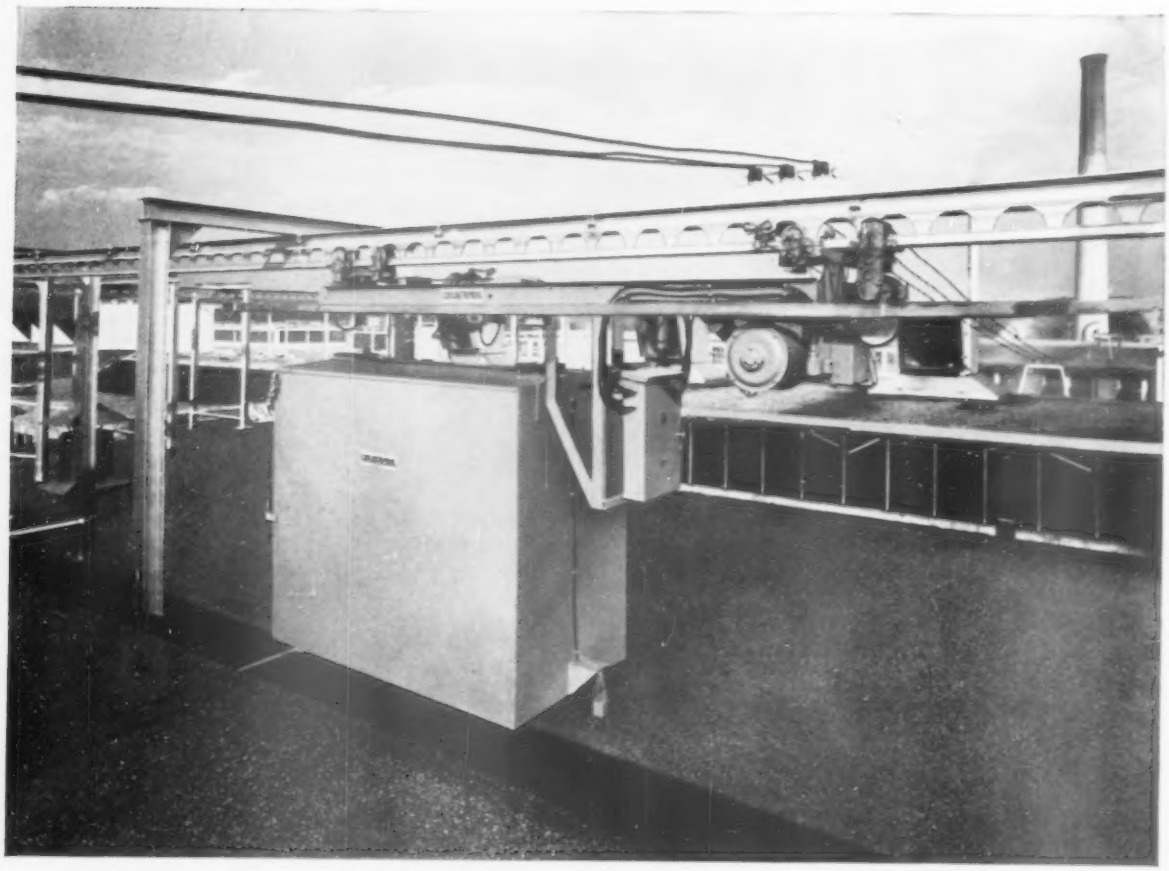
14,782

SCREW CONVEYORS

For more facts circle 499 on Reader Service Card

AUTOMATIC Materials Handling System Operates On Roof

Has paid for itself several times over since installed



THE box-like structure that you see in the photograph above is a traveling van that measures 4'-0" x 8'-0" x 6'-6" high. It is built into a motorized carrier that travels over an extensive Cleveland Tramrail system built on the roof of a large prominent plant.

A large door at the opposite end of the van is swung open during loading. Pallet loads of materials are brought inside the van and set in place. 3000 lbs. can be handled with this particular unit per trip. Other larger units are available.

No special operators are required for the Tramrail system, as it can be kept going easily by the production machine operators along with their regular work. After the van is filled, pressing a button starts the load on its way. The van first travels upward until it is above the roof. Then it goes forward over the extensive track system. When it reaches the roof over one of the two receiving stations, as preselected, it makes the vertical descent to the floor. Here the door is opened and materials removed.

This system brings distant departments close together so that they can operate as efficiently as if they were adjacent to each other. It eliminates need of wide load-carrying aisleways — and thereby saves considerable floor space. It avoids confusion and danger of floor trucks which would normally be required. It greatly cuts costs by drastically reducing time required for materials handling. In fact, the savings made by this system have been so great that it has paid for itself several times over since installed.

Very likely you, too, can make big savings by putting to work that big unused roof of yours. Cleveland Tramrail engineers stand ready to show you how.

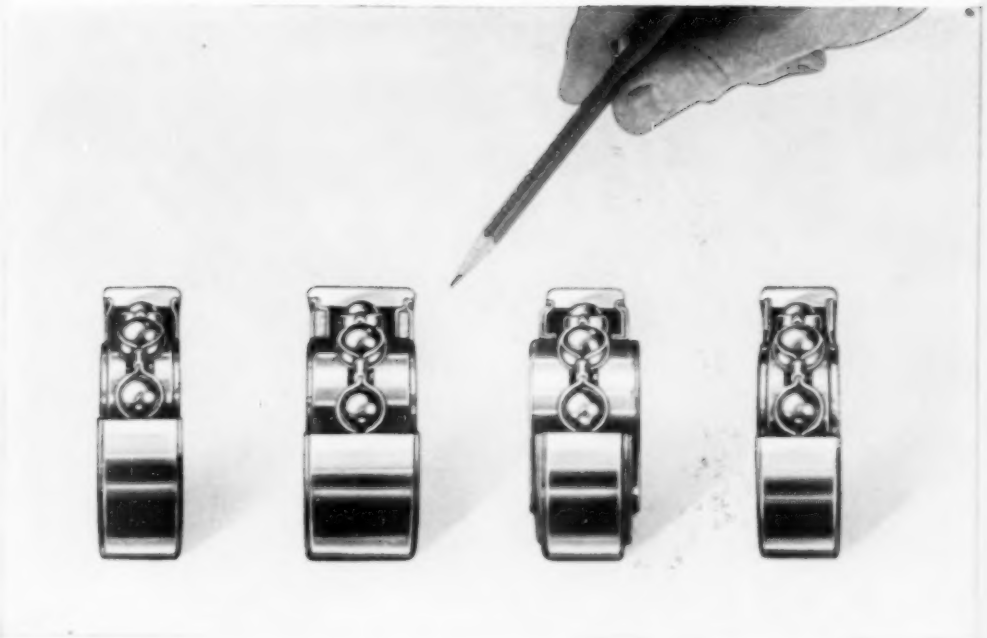
CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 3220 E. 290 ST. • WICKLIFFE, OHIO

For more facts circle 500 on Reader Service Card

WHICH BEARING IS RIGHT FOR YOU?



Play it safe! Do business with an AUTHORIZED FAFNIR DISTRIBUTOR

Four radial ball bearings are illustrated above, all with the same size bore and outside diameter. Each is equipped, however, with a different device for protection against contaminants.

The bearing on the left is designed with metal shields. Felt seals are mounted in the bearing next to it, while in the third bearing, frictionless Mechani-Seals are used. The last bearing is equipped with contact-type Plya-Seals.

Which bearing is right for your particular need? A dependable place to get the answer — to this or any bearing problem — is from your Authorized Fafnir Distributor.

He's a bearing specialist — up-to-date on bearing features and refinements that are of critical importance to you in terms of cost and efficient performance.

As a specialist, he is able to give you expert, unbiased help with your bearing requirements — whether it's a simple matter of replacement or a problem of specifying the proper bearing for a particular application.

By ordering from your Fafnir Distributor, you avoid the risk of equipping with obsolete bearings, or units that are "second best" for the job. You are supplied from stocks of latest manufacture and design.

Play safe. For the most effective and cooperative help in bearing selection, supply, and service, do business with your Authorized Fafnir Distributor.

THE FAFNIR BEARING COMPANY, New Britain, Connecticut

For more facts circle 501 on Reader Service Card

In rotary drilling, pulling a 100-ton, two-mile string of drill pipe subjects the drilling line to the terrific stresses imposed by fast acceleration, shock loads, bending and overwinding on drums. Only wire rope with the highest degree of quality in hardness, strength and fatigue resistance can be used, for toolpushers know that . . .

A quality rope is a safe rope

Whether you use wire rope in the field or in a factory, *safety is just as important to you.* When you buy "bargain" rope you bargain with safety. It can cost you more than the pennies you save. Buy on the basis of *quality*—buy Wickwire Rope.

For extra strength—buy Wickwire's Double Gray IWRC extra improved plow steel wire rope

WICKWIRE ROPE — A CF&I PRODUCT

CF&I

LOOK FOR THE YELLOW TRIANGLE

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N. M.) • Fort Worth • Houston • Kansas City • Lincoln (Neb.) • Odessa (Tex.) • Oklahoma City • Phoenix • Pueblo Salt Lake City • Tulsa • Wichita • **PACIFIC COAST DIVISION**—Los Angeles • Oakland • Portland • San Francisco • San Leandro Seattle • Spokane • **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) New Orleans • New York • Philadelphia

5736

For more facts circle 502 on Reader Service Card

A-W Hydraulic Crane loading ginning machine for shipment at Continental Gin Co., Dallas, Tex.

CONTINENTAL GIN CO. REPORTS:

A-W Hydraulic Crane unloads steel 4 times as fast at ⅓ former cost

To maintain its leading position as a supplier of ginning equipment to the big cotton industry, Continental Gin Co.'s plant in Dallas, Tex., has greatly enlarged its production facilities during the past few years. This expansion, with the additional buildings that arose, produced new problems in materials handling. A study of these indicated that an A-W Hydraulic Crane could save $5 a ton on a conservative 800 tons handled per year – a $4000 minimum saving in handling raw material, transporting heavy parts between buildings, and loading finished equipment for shipment. The crane was therefore purchased and went into service in March, 1955.

Saves $165 on demonstration. The company reports: "Our first 4-hr. demonstration of the crane, with its operator and two hookers costing $8.70 per hour–less than $35 total cost–involved the removal of a 40-ft. column to make way for alterations. This job had been estimated at $200, performed by ordinary methods. On this basis our estimated savings from the crane were very conservative."

Crane reduced cost of remodeling. "We reduced the cost of remodeling our office building by lending the crane to our contractors for pouring concrete foundations and walls. We borrowed a heavy ball from a nearby foundry and broke up old concrete walls in a few hours."

Cuts costs of unloading sheet steel. "We formerly unloaded steel sheets from railway cars with a bridge crane, moved a load on a push cart to storage, and then restacked it. The 5-man gang required cost $7.50 an hour and took 8 hours for the job – a $60 outlay for labor alone. Now the A-W, with its operator and two hookers at an approximate 5-man cost of $8.70 per hour, picks up bundles of these sheets at the car, transports them and stacks them in the covered storage bays in 2 hours at a cost of $17.40. Thus the job is done at a saving of $40 – in ¼ the time and at ⅓ the former cost." Get the full story on the A-W Hydraulic Crane at Continental Gin Co. Write for Certified Gould Report No. 5707.

Austin-Western CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

For more facts circle 503 on Reader Service Card

Ro-Flo COMPRESSORS

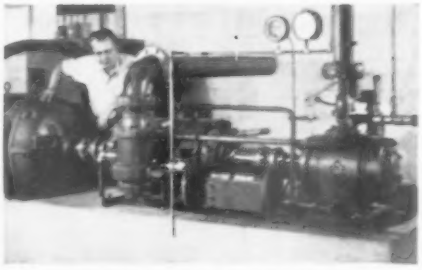
Two-stage rotary compressor supplying plant air for a midwestern manufacturing company.

No shake...no shimmy...no shock!

Rotary operation produces a remarkably stabilizing effect. You don't get the shimmy and shock inherent in reciprocating compressors.

Users in many industries have discovered that *Ro-Flo* compressors eliminate the cost of heavy foundations. A simple slab is enough. Smaller units are bolted directly to the floor. Automatic wear compensation at the rotor blades keeps compressor efficiency at high level even after years of use. There are only two wearing parts.

Ratings—Choose from twelve sizes of two-stage *Ro-Flo* compressors, ranging from 250 to 1800 cfm at pressures from 60 to 125 pounds gauge. Single-stage *Ro-Flo* units handle pressures up to 50 pounds gauge, and handle volumes from 40 to 3000 cfm.



Two-stage rotary compressor used for plant air service in a midwestern plant.

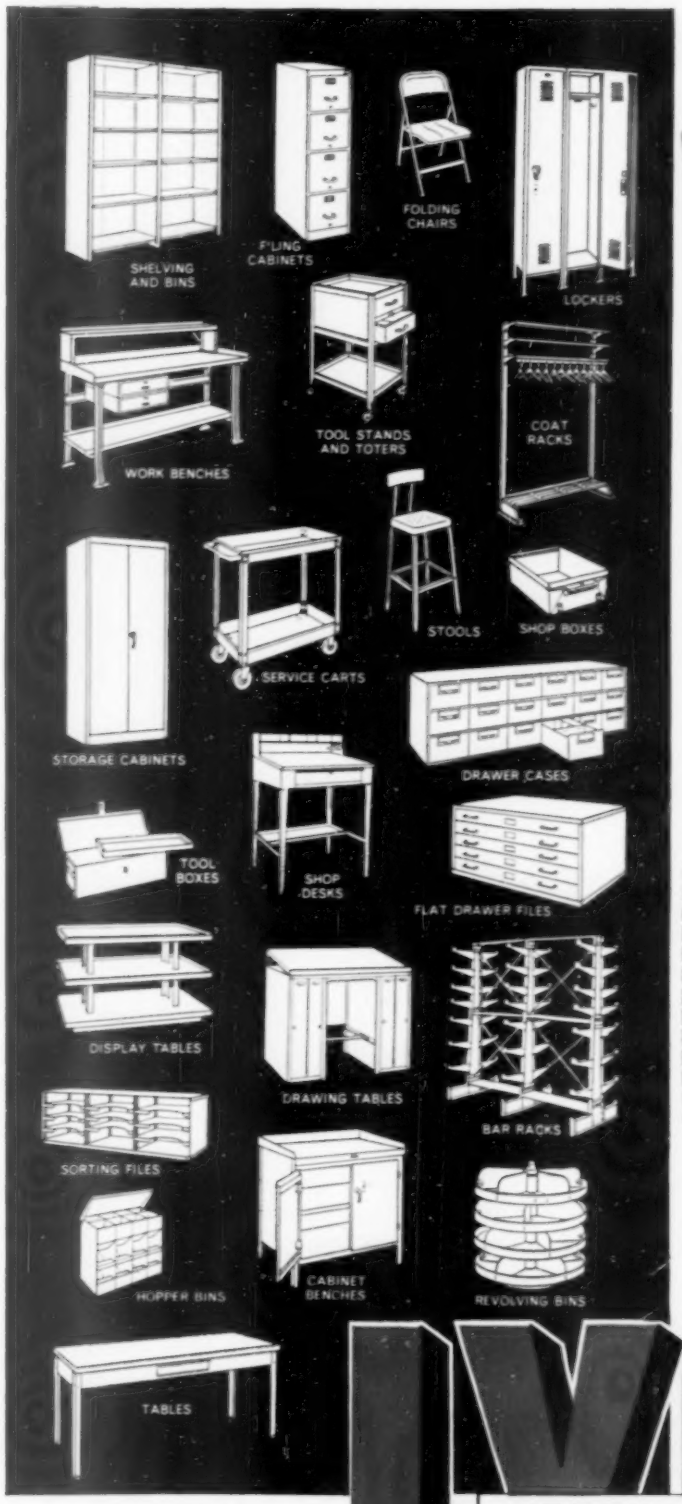
Ro-Flo hydrogen compressor in a southwestern plant, used here in conjunction with acrylic monomer process.

For complete information on Allis-Chalmers rotary compressors, ask for two-stage Bulletin 16B8244 or single-stage Bulletin 16B8126. Call your nearby A-C office or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

Ro-Flo is an Allis-Chalmers trademark.

ALLIS-CHALMERS A-C ALLIS CHALMERS

A-5713



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LYON METAL PRODUCTS, INC.
412 Monroe Ave., Aurora, Ill.

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General Offices: 412 Monroe Ave., Aurora, Ill.
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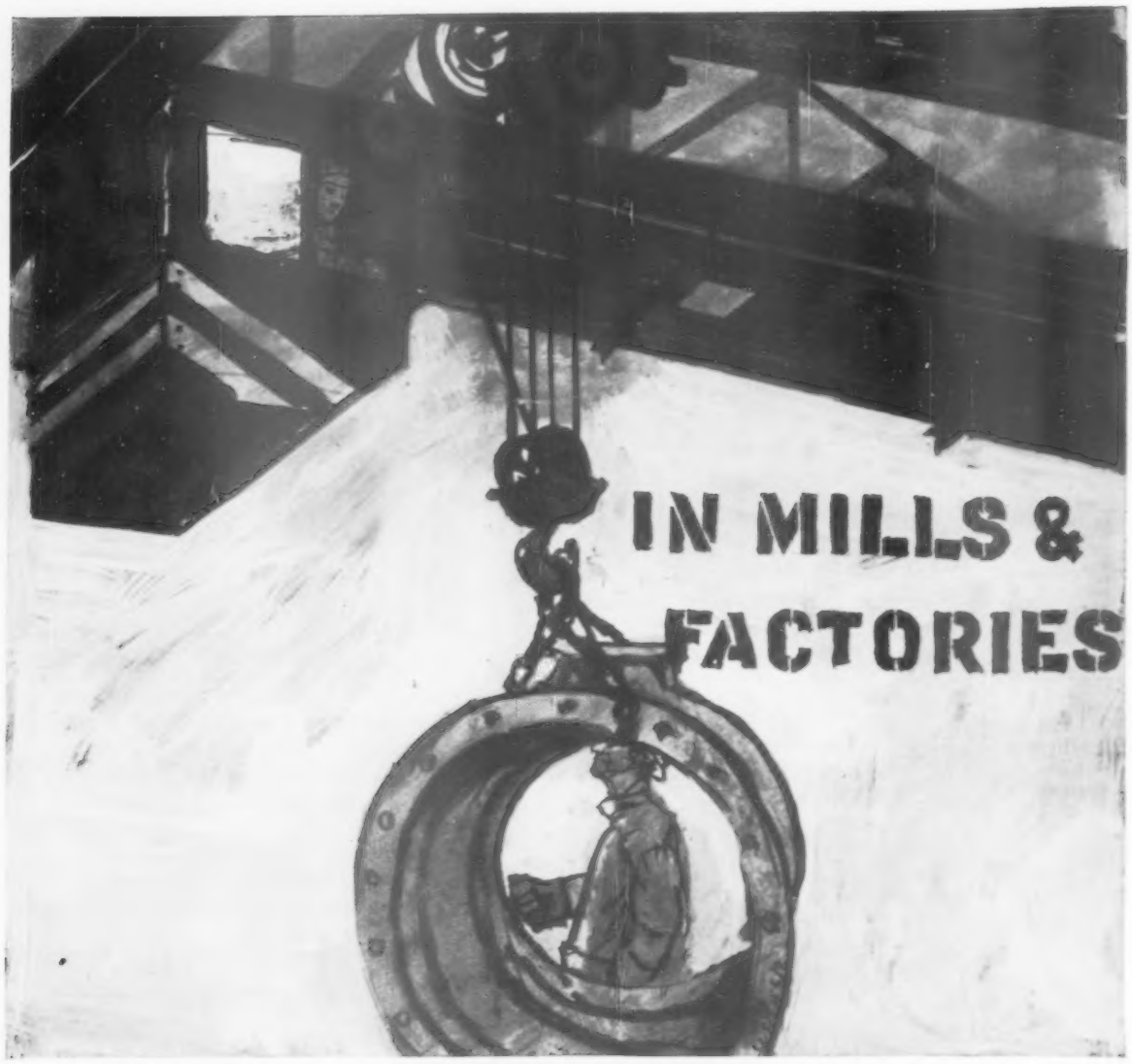
Dealers and Branches in All Principal Cities

Lyon also has complete facilities for manufacturing special items to your specifications

OVER 1500 ITEMS for Business, Industry, Institutions

LYON® STEEL EQUIPMENT

For more facts circle 505 on Reader Service Card



NOTHING **TRANSMITS POWER** WITH THE **TENACITY** OF ROEBLING ROYAL BLUE WIRE ROPE. The other reasons why this wire rope gives long, dependable service are equally outstanding. It has exceptional flexibility, shock and abrasion resistance, and high strength beyond the realm of common wire rope usage. Collectively, these qualities give you a wire rope that is a superior value . . . Roebling Royal Blue. For details of the most widely accepted wire rope in Roebling's history, see your local distributor or write to Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

For more facts circle 506 on Reader Service Card

Hall Industrial Water Report

VOLUME 6 APRIL 1958 NUMBER 2

Steam-Electric Power Plants Have to Keep Rolling

If they don't, our whole complex machinery of civilization suddenly dies. Mills go down, office buildings go dark, air conditioning stops—even television is blinded.

Undisciplined water can cause unscheduled outages. That is why upwards of 300 utilities and more than 2500 industrial steam generating plants retain Hall Laboratories to help them avoid water problems and to solve them when they do occur. This is a most important part of Hall's activities on all kinds of industrial water—cooling water, service water, process water, waste water.

Disappearing Phosphate

One summer the operators in a Midwestern utility plant were puzzled by the disappearance of boiler water phosphate residuals over a number of consecutive week ends. Then to their dismay, boiler tubes began to fail as a result of scale formation.

It was obvious to Hall Engineer J. F. Nelson that the boiler feedwater was being contaminated with hard water over week ends, but finding the point of contamination proved difficult. Innumerable samples of feedwater drawn hourly by the operators showed only the usual 0.5 ppm or less of hardness. However, one night when the air conditioning load dropped abnormally because of cooler weather, hardness showed up. It was traced to a small boiler feed pump used only for light loads. Hard water used for sealing was leaking into the pump suction when load was sufficient to reduce the pressure below that of the sealing water.

Diagnosis had been difficult because contamination occurred only with the small pump used when loads were light and only when this pump was operated at full capacity. These conditions were experienced mainly over week ends.

As with most problems, correction was easy once a satisfactory diagnosis had been made. Substitution of condensate for hard water as gland sealing water eliminated the contamination regardless of load.

An Opportune Visit

On a routine visit to a western utility plant Hall Engineer C. L. Fitzgerald found management trying to decide what to do about preparation of makeup water for a new steam-electric unit. The inclination was to use existing evaporators because of a $100,000 price tag on demineralizing equipment. How to pretreat evaporator feedwater was the pressing problem.

The existing pretreating equipment consisted of an old lime-soda plant operated batchwise in the cold. Consideration was being given to costly, extensive repair work on the old plant and to installation of individual chemical feed tanks and proportioning pumps for the evaporators. Fitzgerald agreed that the changes contemplated would facilitate water treatment and improve evaporator feedwater conditions and vapor quality. However, he was quick to propose an alternative which would involve lower capital investment and operating cost.

Fitzgerald's recommendation was to scrap the existing equipment and to replace it with sodium zeolite softeners costing approximately $2000. Two existing tanks could be used for storage of softened water and one chemical tank and proportioning pump would suffice to feed chemicals into the water line to the evaporator preheater. This arrangement would not only produce excellent quality water for the evaporators but it would do so with a minimum of attention and at low cost.

The scheme proposed was not hard to sell to management. Capital expenditure dropped by stages from the first considered $100,000 to a final figure of close to $2000. The daily saving in chemical cost was sufficient to amortize the expenditure in little more than one year.

Why So Much Copper

When a routine analysis disclosed the presence of an unusually high concentration of copper in the recirculating cooling water at a midwestern city light plant, the operators were justifiably alarmed. That the copper was accelerating corrosion of steel was indicated by a steel test strip removed from the cooling water system. Along with severe pitting, the strip showed copper plating.

No copper compound was being used as an algaecide. Furthermore, routine checks showed the pH value of the circulating water to be 8.0, high enough to control corrosion of copper alloy condenser tubes.

Hall Engineer W. E. Pfeiffer reasoned that the copper source had to be the condenser tubes. Perhaps pH control was not really as good as indicated. Upon investigation, he found that the operators, to facilitate acid feeding, had changed the point of application and were feeding intermittently at hourly intervals. Further determinations revealed that while the pH value of the circulating water at the condenser outlet was 8.0 when acid feed was started, during the short period of acid introduction it dropped to 3.0.

With the problem in focus, changes were made to feed acid properly and thus return to normal the copper content of the water and the operator's peace of mind.

Industrial Water Problems Require Special Handling

There are no "stock answers" to industrial water problems. For information on how the Hall System can help you solve your particular water problems, write, wire or call address below.

Water is your industry's most important raw material. Use it wisely.

HALL LABORATORIES
DIVISION OF MAGAN CHEMICALS & CONTROLS, INC.
MAGAN BUILDING, PITTSBURGH 30, PENNSYLVANIA
DIVISIONS: CALGON COMPANY, HALL LABORATORIES
IN CANADA: MAGAN CORPORATION (CANADA) LIMITED, TORONTO

Hall Laboratories—Consultants on Procurement, Treatment, Use and Disposal of Industrial Water

For more facts circle 507 on Reader Service Card

This new *TRANSISTORIZED* 2-way radio...

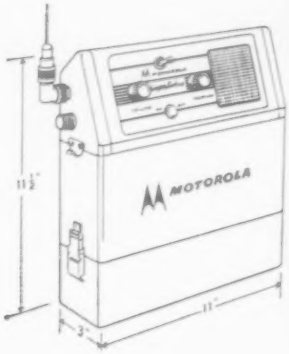
FITS ANY VEHICLE

Here is the first 2-way radio specifically designed for materials handling equipment.

Motorola's Industrial DISPATCHER radio is the *smallest* mobile 2-way radio available. By replacing most tubes with transistors, and using plated circuitry, this radio has been made so compact it can be mounted easily on any of your industrial vehicles.

Here's a new transistorized 2-way radio that *minimizes* current drain . . . requires as little as ⅛ the current formerly required. The DISPATCHER radio requires only 5 to 10 ampere-hours for a full 8-hour shift . . . a negligible amount that won't be missed even by electric powered vehicles. And for electric vehicles where voltage varies widely throughout the day, this radio includes a small transistorized voltage regulator that automatically maintains peak radio performance through all voltage fluctuations.

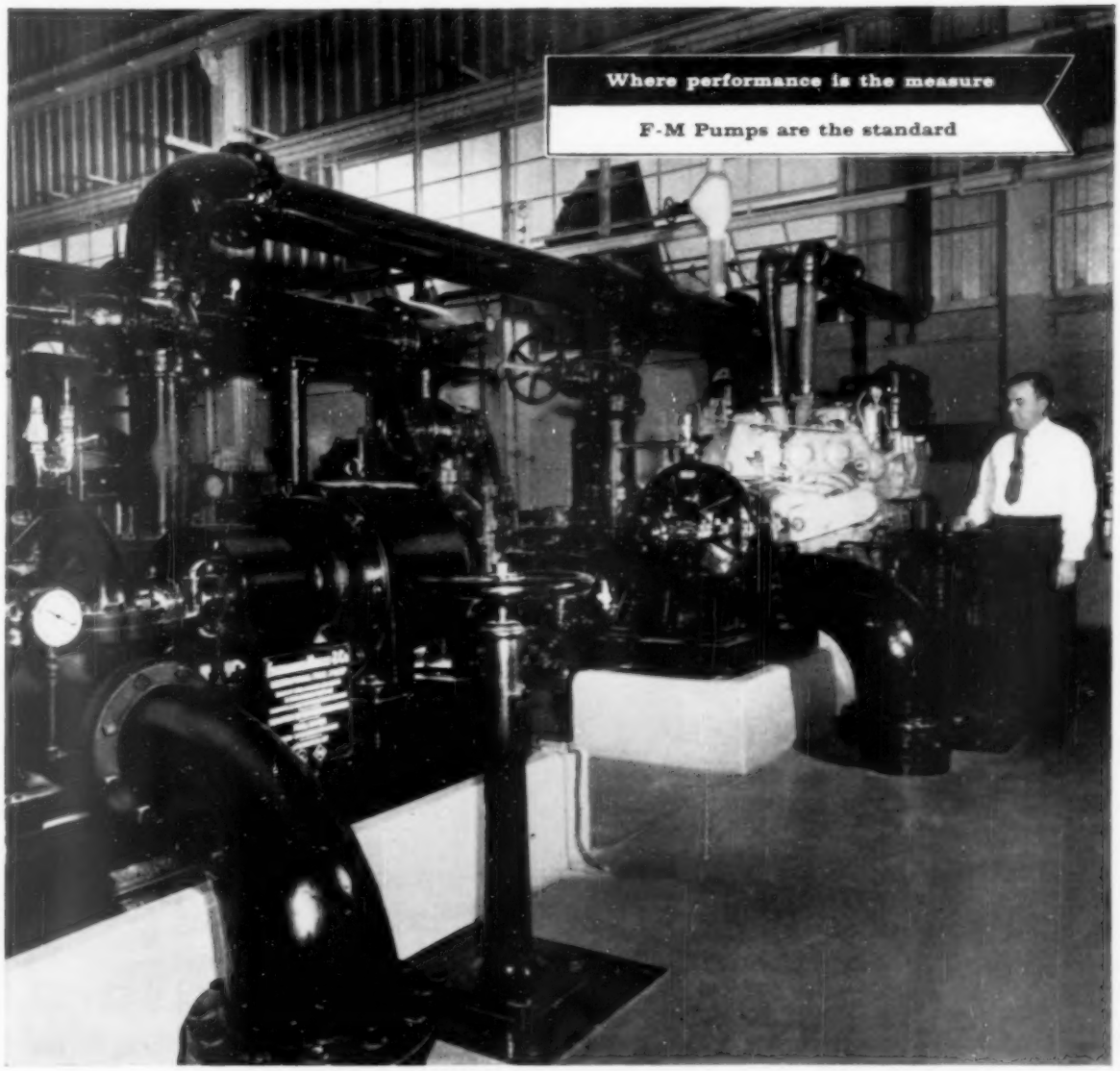
Put this rugged radio to work for you in your materials handling operations. No matter what kind of industrial vehicle you have—gasoline, LP gas, diesel or electric powered—there's a Motorola DISPATCHER radio for you. Get all the information, and you'll see why an investment in the DISPATCHER radio soon pays for itself in the time it saves. Write today.



MOTOROLA INDUSTRIAL **dispatcher** TRANSISTORIZED RADIOPHONE

MOTOROLA Communications & Electronics, Inc. A Subsidiary of Motorola Inc. • 4501 Augusta Blvd., Chicago 51, Illinois

For more facts circle 508 on Reader Service Card



Mr. George Biggar, plant engineer of Ford Motor Company assembly plant at Mahwah, N. J., checks Fairbanks-Morse fire pumps (1500 gpm. motor-driven pump in foreground, 2500 gpm. diesel-driven pump near Mr. Biggar).

Ford guards against fire at giant new plant

To protect one of the world's largest auto assembly plants against fire, Ford Motor Company depends on these two Fairbanks-Morse fire pumps. As the heart of an extensive system, the two F-M pumps provide defense in depth, one pump backstopping the other.

This installation is typical of the great care and planning by modern industry to prevent the catastrophe of fire. Call in your F-M Sales Engineer for expert assistance in pump specification. As builder of the world's greatest variety of hydraulic combinations, Fairbanks-Morse will provide the exact type, exact size pump you need for maximum dependability.

For information write Fairbanks, Morse & Co., Dept. F-4, 600 S. Michigan Ave., Chicago 5, Ill.

Ask for F-M Fire Pump Bulletins 5814F (horizontal) and 6920F (vertical).

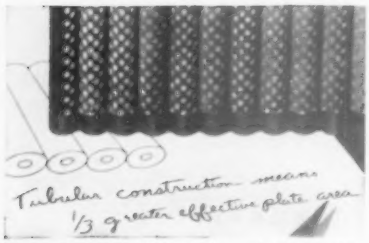
FAIRBANKS-MORSE

a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS

For more facts circle 509 on Reader Service Card

How Would You Like to Get 25% or Even 56% More Work out of Your Present Electric Trucks?

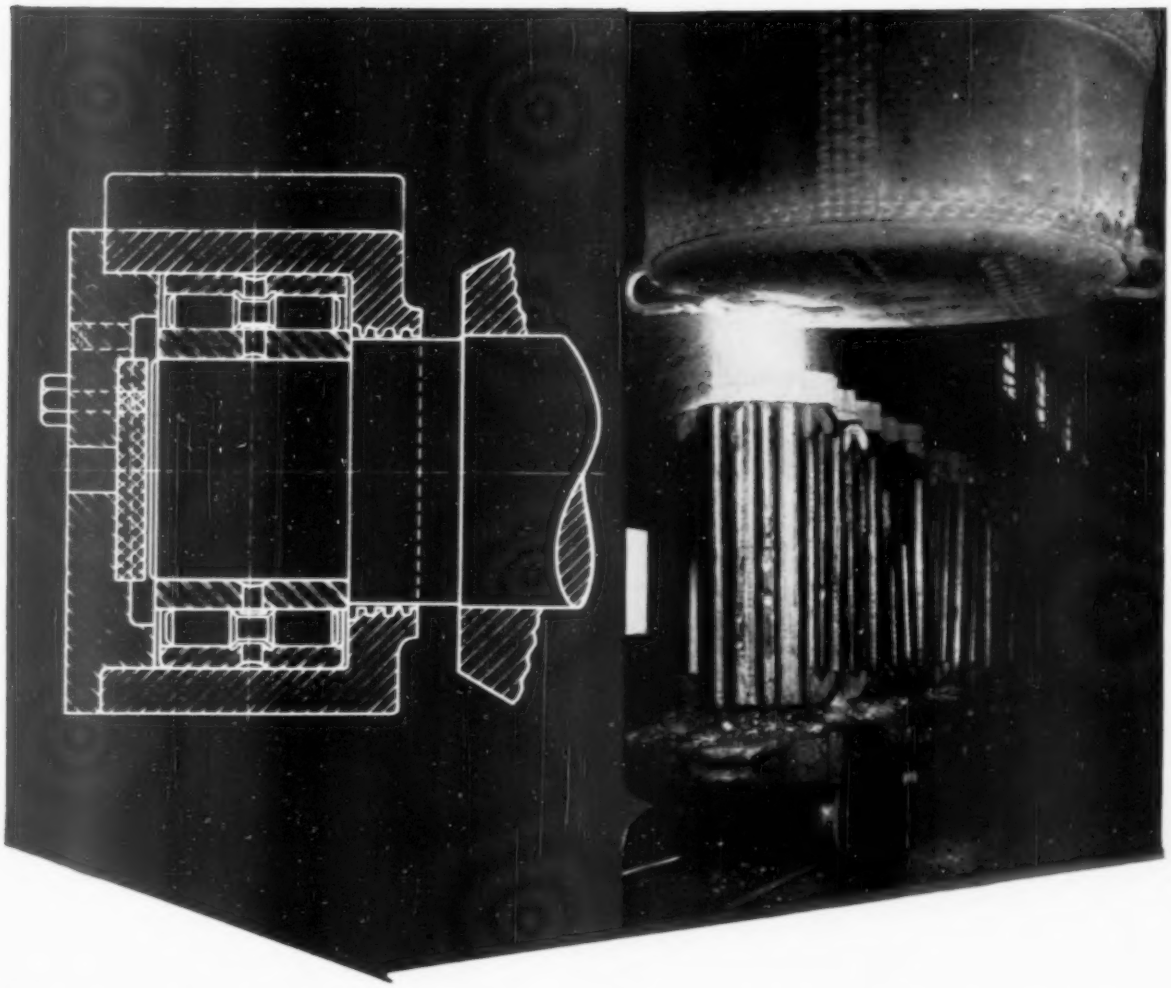


Here's the secret. Unique advanced tubular construction. Every positive plate packs more power. So you get greater battery efficiency—more power in the same size to fit your present trucks.

With the new Exide-Ironclad Batteries now available, your present trucks can work 25% to 56% longer than with batteries you have bought in the past. Now electric industrial trucks can do more work per shift, work longer, cost less than ever to own and operate. Only Exide batteries offer the twin advantages of more power and longer life. Find out just how much you can gain. Call your nearby Exide office. Or write Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

For more facts circle 510 on Reader Service Card



Bearings, Inc. engineering service . . . solves another bearing problem

Ingot mold cars for a large tube mill were continually out of service due to the short life of babbitt, bronze or other bearings originally supplied in the cars.

The Trouble? Bearings, Inc. engineers found shock loads far beyond the capacities of the original bearings. Extreme wear on bearings due to excessive skewing, bent axles and uneven track.

The Answer. Shown above is the Bearings, Inc. drawing of the installation that replaced the original bearings. It has greatly increased load capacity and no dimensional change is required in the shaft or bearing housing.

The Result. The new bearing is designed on a new principle that keeps rollers in line and eliminates skewing. Shock loads due to uneven tracks have little effect on our installation for its construction makes possible a greater number of rollers available to support the load at all times.

This is just one of the many such problems we have solved for our customers. In all cases we supply only bearings we are authorized to distribute. They are new and come to you fresh in the manufacturers' boxes.

If you have a bearing problem or need replacement bearings in a hurry — call or write our branch nearest you, they're ready to give fast service.

Providing bearing service in the North➤ **BEARINGS, INC.**

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Lockland • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute • **PENNSYLVANIA:** Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Parkersburg • Wheeling • **NEW JERSEY:** Camden
NEW YORK: Buffalo, Balanrol Corp. • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington

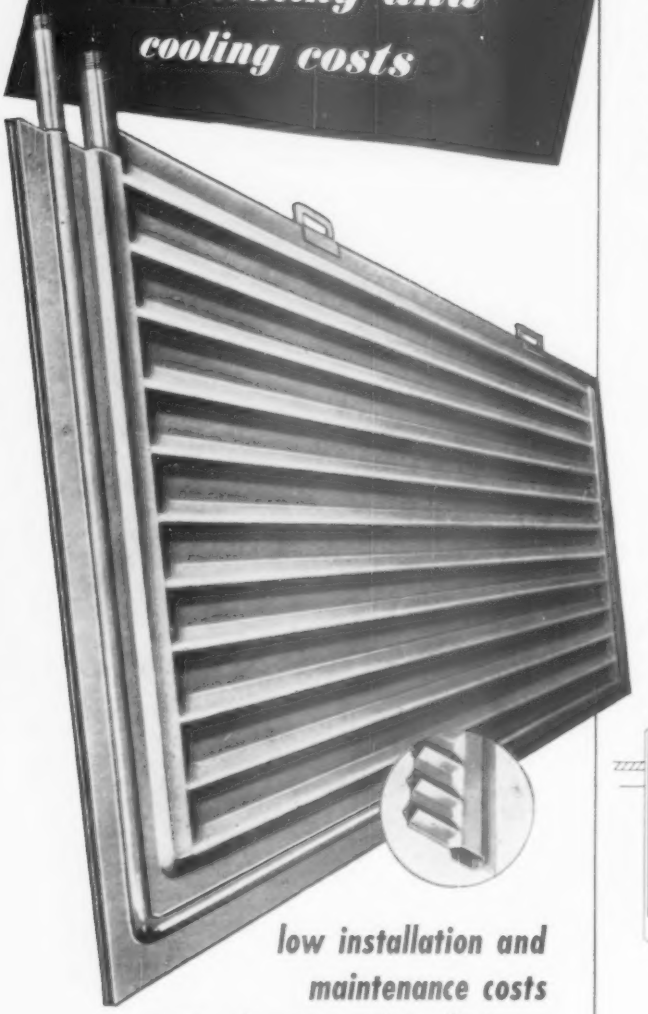
and in the South➤ **DIXIE BEARINGS** *INCORPORATED*

FLORIDA: Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge • New Orleans
N. CAROLINA: Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport • Knoxville • Nashville

For more facts circle 511 on Reader Service Card

pipe coils are old fashioned...

modern PLATECOIL® cuts heating and cooling costs



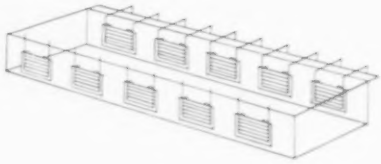
low installation and maintenance costs
greater heat transfer efficiency
lower space requirements

Write for free Bulletin P-60 "HOW TO CUT HEAT TRANSFER COSTS WITH PLATECOIL" for complete information.

KAWNEER uses stainless steel PLATECOIL® units in acid anodizing tanks

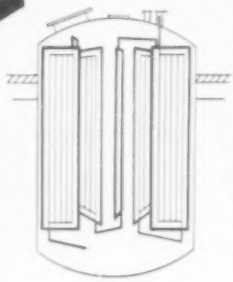
Ease of changing, cleaning and repair are among the advantages of PLATECOIL over pipe coils cited by the KAWNEER CO., Architectural Products Division at Niles, Michigan. Low installation costs, good maintenance and space savings over pipe coils plus heat transfer efficiency are advantages which this company has obtained by using PLATECOIL. The PLATECOIL units are used for heating in water seal, caustic and cleaner tanks; for cooling in anodize tanks.

The drawing shows the location of the PLATECOIL units in an acid anodizing tank.



SHELL CHEMICAL uses PLATECOIL® in synthetic rubber reactors

Stainless steel PLATECOIL units remove heat liberated in synthetic rubber polymerization reaction at the Torrance California plant of Shell Chemical Corporation.



High efficiency, low cost per unit surface, ease of cleaning and improved agitation are cited as benefits obtained through use of PLATECOIL in this application. The PLATECOIL units were fabricated into vertical banks as indicated in the sketch.

TRANTER MANUFACTURING INC.
LANSING 9, MICHIGAN

PLATECOIL®
DIVISION

For more facts circle 512 on Reader Service Card

CRACK THE TOUGH ONES

With

PRODUCTION MACHINERY

GREENLEE **AUTOMATIC BAR MACHINES**

Greenlee Standard and Special Machine Tools

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Six and Four-Spindle Automatic Bar Machines
- Hydro-Borer Precision Boring Machines

Maintain Tight Tolerances with Higher Speeds and Feeds

Greenlee 4 and 6-Spindle Automatics offer you both job range flexibility and sustained production.

The base and frame of Greenlee Automatics are heavy, rigid semisteel castings. Spindle carriers are heat-treated, ground one-piece castings. Headstock is scraped to fit the carriers. Precision spindles are dynamically balanced . . . ride on five widely spaced, pre-loaded, precision ball bearings for maximum accuracy.

Save set-up, maintenance and production time. Investigate Greenlee automatic bar machines. See your Greenlee Distributor.

• • •

Do you receive a copy of the Greenlee "Automatic News" regularly? If not, ask to be placed on our mailing list today.

GREENLEE BROS. & CO.

2224 MASON AVE.
ROCKFORD, ILLINOIS

For more facts circle 513 on Reader Service Card

"We broke the bottleneck on this part . . . purchasing called in Ryerson"

Keeping production schedules running smoothly is often as simple as eliminating a bottleneck—caused by using materials that don't fully meet your particular requirements.

Time and time again, Ryerson Steel specialists are able to recommend steel that will do a better job. Ryerson men can document cases where a switch in steels provided up to 50% faster machining . . . 300% longer tool life . . . less rejects in forming . . . faster, more dependable welding, etc.

Furthermore, Ryerson service gives you complete flexibility of steel supply *without long-term commitments.* If production calls for a sudden change, you can select the kind of steel you need from unsurpassed Ryerson stocks. You get the right steel, in the quantities you want, exactly when you want it.

Ryerson's size, facilities, staff and service *attitude* assure fast delivery to meet regular schedules or to handle special short-run orders. This dependable source of certified steel is right at your finger tips. Just phone your nearby Ryerson plant—or check with your Ryerson representative — for prompt, personal service.

RYERSON CERTIFIED QUALITY

RYERSON STEEL

Member of the INLAND Steel Family

Principal Products: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metalworking machinery, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

For more facts circle 514 on Reader Service Card

FACTORY
MANAGEMENT AND MAINTENANCE
. . . PRESS TIME REPORT • APRIL 1958

Looking Ahead in Business

How serious is the 1958 recession? Is it worse than the mild downturns of '54 and '49? Are we heading into the first real depression since World War II?

In a word, NO. Even without a tax cut, we aren't in for that kind of trouble.

Most FACTORY indicators have already taken their worst tumbles. While hardly a cheery month, February might well be the low point of the slump. Factory output dropped another 3 points and is now some 16 points below a year ago. Unemployment shot up to 5.2-million—the highest total in 18 years.

•

But business should get some lift from defense spending and a turn in inventories over the next few months. Right now business is still trimming excess stocks with a vigor seldom matched. More than 75% of the $7.5-billion drop in fourth-quarter GNP came from inventory run-offs. Meanwhile over-all consumer demand has not slumped that much, and new orders for defense goods are about to rise. Easier credit and strong personal income will also support a second-half rebound.

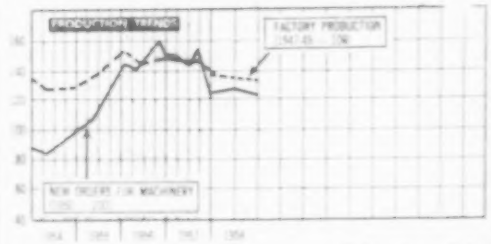
As straws in the wind, note that new orders for machinery and industrial contracts have stopped their long, steep decline. Generally, when these two indicators perk up, a recovery is not far away.

•

So far, it's been a mild recession. Statistically, the current decline has just about matched the 1954 and 1949 adjustments. To tick off the figures: Industrial production is running about 10% behind, just about the same as the peak-to-bottom dips in the two other post-war recessions. Personal income is down about 1%, compared to 1.5% in '54 and 5% in '49. Prices are going down less. And unemployment (a seasonally adjusted 6.7%) is a shade worse than '54, still not as bad as in late '49.

More important, this year's slump has been largely confined to hard goods. Since last August's peak, durables have dropped 26 points on the FRB index, non-durables only 6 points. And in the three large fields of retail and wholesale trade, government, and services—which make up over 60% of non-farm employment—there has been virtually no recession.

FACTORY FIGURES OF THE MONTH



Indicator	Feb. 1958	Jan. 1958	Feb. 1957
New Orders for Machinery (exc. elec.)[1]	122.0p	125.0	150.0
Contracts for Industrial Construction[2]	98.0	99.0	153.0
Factory Production[3]	131.0p	134.0	137.0
Consumers' Prices (cost of living)[4]	122.7p	122.3	118.2
Industrial Prices (materials, supplies)[4]	125.8	126.2r	125.5
Manufacturing Employment (millions)[5]	15.6	15.9	16.9
Total Employment (millions)[5]	62.0	62.2	63.2
Unemployment (millions)[5]	5.2	4.5	3.1

p=preliminary r=revised *=estimate

Sources: 1. McGraw-Hill Dept. of Economics (1950=100); 2. Engineering News-Record (1950=100); 3. U. S. Federal Reserve Board (1947-49=100); 4. U. S. Dept. of Labor, Bureau of Labor Statistics (1947-49=100); 5. U. S. Dept. of Commerce, Bureau of the Census (new series).

How much of a rebound is coming later in '58 depends largely on Washington—and whether Congress cuts taxes or votes a bigger budget. Sentiment for both a tax cut and public-works spending is growing. Congress is pretty sure to extend unemployment benefits. And any tax cut will be at least $5- to $6-billion.

•

It's obvious that we won't be back to boom times until capital investment starts moving up again. The latest Department of Commerce survey throws some cold water on hope for a quick turn-around here. Government figures anticipate a substantial 13% drop in '58. But we'll know more about what's happening in this key sector with the results of the McGraw-Hill survey now being tabulated.

Meanwhile it's clear that the bottom hasn't fallen out of the economy. The slump has been quick, even sharper than expected. But the worst is pretty much over. As one economist summed it up: "Business is getting retroactively—not progressively—worse."

FACTORY
MANAGEMENT AND MAINTENANCE
. . . PRESS TIME REPORT • APRIL 1958

Ideas of the Month

(For more information, circle item numbers on Reader Service Card next to back cover)

Best personnel posters we've seen in many a moon are six brand-new ones *(The Publication Counseling Service)* on such subjects as "How and What to Eat," "Sleep Well, Wake Refreshed," "Don't Bottle Up Your Gripes." **(311)**

New slimmed-down filing cabinet called Simplifile *(Rockaway Metal Products Corp.)* is designed to hold more than any conventional case. Has three shelves, hand-adjustable steel dividers. Comes with or without retractable doors. Fits into close quarters, or any area where space is limited. **(312)**

Slippery spots in your plant? Your safety director could do worse than take a look at Shur-Treds *(Coated Abrasives, Inc.)*. They're easily attached to shoe-soles—and minimize danger of slipping or skidding. **(313)**

If your fork lift trucks work outside as well as in, how about equipping them with canvas (heavy army duck) enclosures *(D. & M. Truck Top Co.)*, thereby protecting your drivers against the elements? **(314)**

Balky freight car doors give up in a hurry—20 seconds or less—when tackled with newly improved one-man car-door opener *(Nolan Co.)*. **(315)**

APICS may look like an anagram of something good to eat. It really stands for something good for somebody in your organization to join. We mean the recently organized *American Production and Inventory Control Society*. **(316)**

Your maintenance men will go for Select-O-Ring Kit No. 2 *(Bearings, Inc.)*. It contains 180 "O" rings in sizes 1 to 25 which are used on 70% of industrial equipment incorporating "O" rings as sealing members. **(317)**

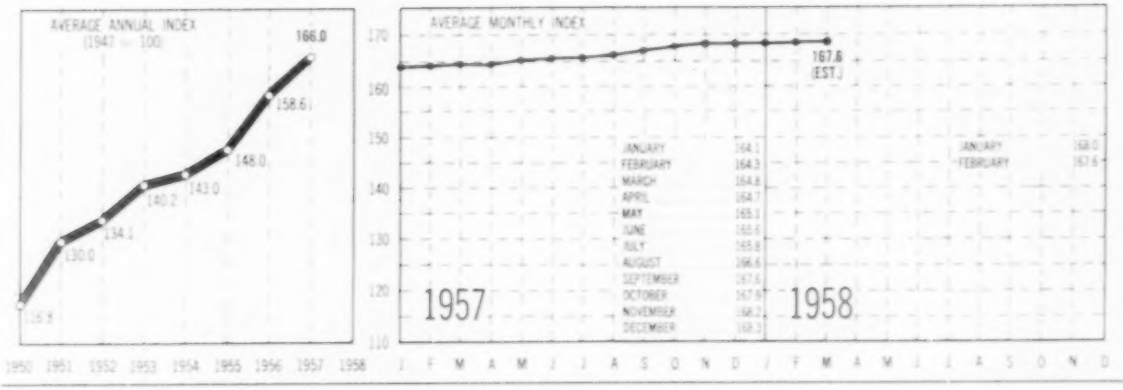
For better communication with employees, we heartily recommend two new guides *(Chamber of Commerce of the U.S.)*: "Employee Publications" (48 pages) and "Letters to Employees" (32 pages). Both are how-to-do-it manuals full of examples that show how letters and company publications may be used to explain and interpret business and the American economic system. **(318)**

Mylar grid sheets and templets *(F. Ward Harman Associates)* provide man who makes plant layouts with practically indestructible tools. Both grids and templets have matte surfaces for pencil or pen notes. **(319)**

More Ideas of the Month on pages 100 and 101

FACTORY
MANAGEMENT AND MAINTENANCE
. . . PRESS TIME REPORT • APRIL 1958

Cost Index of Plant Maintenance



Index Takes Slight Dip

Declining workweek is a major factor in reversing upward march of costs.

FACTORY'S COST INDEX is moving downward. The revised January figure of 168.0 represents a fractional dip from December, when the Index was 168.3. And the gentle slide continued in February with the Index registering a preliminary 167.6.

Not since the recession of 1954 has the Index fallen two months in a row.

The January-February drop was noteworthy because labor as well as materials costs fell. The fall in the average hourly earnings of maintenance workers was due to continued shrinkage of the workweek.

The extent to which the workweek has declined is pointed up by comparing this year's factory workweek with that of a year ago. In February 1957 factory workers were putting in 40.2 hours a week, with overtime averaging 2.5 hours. This February the workweek was down to 38.5 hours and overtime had slipped to 1.5 hours. The decline has been most pronounced in durable goods, where the workweek has fallen off 2.1 hours and overtime has shrunk by 1.2 hours.

But reduced overtime cannot long hold down average hourly earnings. The following factors assure a resumption of the rise in labor costs this year: cost-of-living adjustments in wage rates, affecting 4.3-million workers (consumer price index continues to climb); automatic wage hikes, affecting 3.3-million; and renegotiation of long-term contracts, involving 1.6 million.

	AVERAGE 1957	FEBRUARY (Preliminary)	JANUARY (Revised)
Building and Facilities Index	156.9	159.[illegible]	159.3
Materials	140.6	140.4	140.5
Brick	147.8	148.1	148.1
Elec. fixtures	128.0	128.9	128.9
Elec. switches, boards, fuses	175.7	179.9	179.9
Elec. wire, copper	136.6	118.6	118.6
Glass	152.6	152.6	152.6
Gutters, spouts, ducts	169.4	169.6	169.1
Gypsum products	134.5	134.5	134.5
Heating equipment	128.2	127.4	127.6
Lumber	126.7	123.1	123.3
Millwork	147.1	146.3	146.3
Paint	128.1	130.2	130.2
Pipe, cast iron	165.8	170.4	170.4
Pipe, steel	188.1	190.1	190.1
Pipe & tubing, copper	156.0	146.2	146.2
Roofing	129.8	132.4	132.4
Sanitary fixtures	151.4	145.4	150.2
Sash, metal frame trim	145.7	148.0	148.0
Solder	121.2	116.4	116.4
Steel, structural	222.0	227.7	227.7
Tanks, steel	138.3	139.3	139.3
Valves & fittings	159.9	159.2	162.3
Wire mesh	166.9	158.5	158.5
Labor	167.7	171.6	171.8
Carpenters	154.6	157.1	157.1
Electricians	174.6	176.3	176.8
Painters	173.9	181.5	181.5
Equipment Index	169.9	171.3	171.7
Materials	167.7	170.6	171.0
Abrasives	154.1	159.9	159.9
Alloys, non-ferrous	127.2	116.5	117.1
Bars & plate, steel	214.8	220.9	220.9
Bearings	166.2	170.9	170.9
Belting	150.9	149.7	149.7
Bolts, nuts & screws	222.9	230.5	230.8
Chain	177.6	184.0	184.0
Controls (electrical)	175.7	179.9	179.9
Gear-reduction units	180.4	181.7	181.7
Hand tools, mechanics	185.1	192.3	192.3
Lubricants	87.8	87.3	87.6
Motors	143.5	145.8	145.6
Non-ferrous metals	133.3	119.4	119.4
Precision tools	150.2	153.2	153.2
Pumps	177.2	183.2	183.1
Tools, cutting	162.3	170.7	170.6
Valves & fittings	159.9	159.2	162.3
Labor	171.4	171.7	172.1
All mfg. labor	167.5	169.8	169.8
Machine tool labor	175.4	173.6	174.4
FACTORY'S COST INDEX	166.0	167.6	168.0

FACTORY
MANAGEMENT AND MAINTENANCE
. . . PRESS TIME REPORT • APRIL 1958

Looking Ahead in Labor

One of the nightmares that keep plaguing organized labor is automation. Is the wizard machine, over the long haul, a friend or a foe?

Labor always views automation with suspicion. Some days the suspicion turns to downright hostility. Such a day came recently when a Milwaukee arbitrator ruled that the Schlitz brewers were entirely within their rights in replacing a human switchman in the carton department with an automatic control panel. This is the sort of incident, multiplied many times over, that has led big labor to call for a new appraisal of automation.

•

AFL-CIO's Industrial Union Department has invited all affiliates to send negotiating experts to a one-day conference at Washington on April 22 on "Automation and Major Technological Change." A look at the program suggests that a more appropriate subject would be, "How Do We Live With It?" Albert Whitehouse, director of the department and organizer of the conference, says, "Changes in job opportunities, job content, and working conditions are having a serious impact on labor-management relations in countless plants."

Program includes two case studies of automation's impact—at Ford Motor Company and in the railway industry. Liberal economist Robert R. Nathan will speak on public policy for full employment in an era of technological revolution. And there'll be roundtables on the impact of automation on wage and job relationships and upon the size, structure, and function of the labor union.

AFL-CIO knows realistically it can't halt automation, but would like to slow it down. One thing to watch in the future: Labor's bargainers will try to drive harder deals for fatter, more comprehensive severance-pay clauses to cushion workers who are displaced by machines.

•

The recession makes labor more aware of automation for the time being. But the new conference on labor's adjustment to technological change is just one reaction of many of labor's chieftains to the economic slide, which is proving more durable than was generally thought likely a while back.

AFL-CIO President George Meany and his chief lieutenants, through a mid-March Washington rally, put themselves in position to claim some labor influence on the government's anti-recession program —whenever it is finally wrapped up by Congress and the White House.

Meany called 1000 top AFL-CIO unionists to the capital for a "Put America Back to Work!" rally on the very day the government announced unemployment had gone past 5-million. Meany and the Federation's executive committee also got an audience with President Eisenhower, who listened to big labor's prescription—tax cut for individuals, more unemployment benefits, multi-billion spending on public works and defense.

The government's recovery program, before summer's end, likely will include all those things, but not in the same order or in the magnitude that the Federation wants.

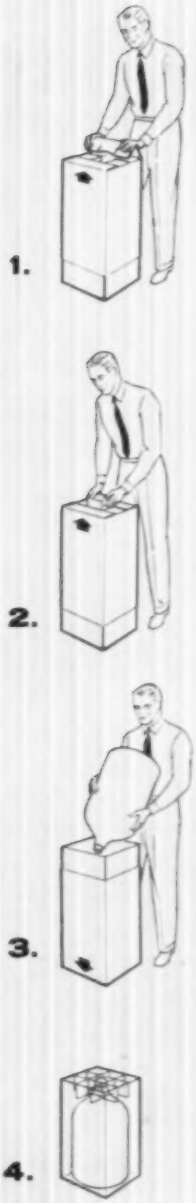
•

Some competent observers now see no restoration of economic bounce before fall and the possibility, meanwhile, of 6-million unemployed. This prospect guaranteees drastic federal moves. It's a good bet a tax cut will be voted to accompany already promised deficit spending. But it's also a good bet that tax cuts will be for business and individuals—not just individuals, as labor asks.

Recession puts labor negotiators in a ticklish spot, but the Federation is still talking tough on money demands. "Don't let anyone tell you this is the time to hold the wage line," says Meany. Even so, union negotiators know that jobless men on the streets are hardly a sight to inspire zest in any strike call. They also know that employers, especially in manufacturing (where production is off the most and unemployment highest), will strengthen their resistance against concessions to head off threatened strikes.

Union leaders, however, make two big arguments: Prices have held firm and high generally, despite the production downturn. And a year from now, if most economic prophets are right, the recession will have faded and the problem will be galloping inflation. In that situation the worker will need more money just to keep even.

SEE LABOR RELATIONS NEWS, PAGE 208



New shipping box for battery acid...

Corrosive liquids ship safely, economically in easy-to-handle polyethylene bottle and H & D corrugated box. Lightweight unit fills and dispenses quickly without opening box. For your packaging problem, better see H & D.

HINDE & DAUCH

Division of West Virginia Pulp and Paper Company

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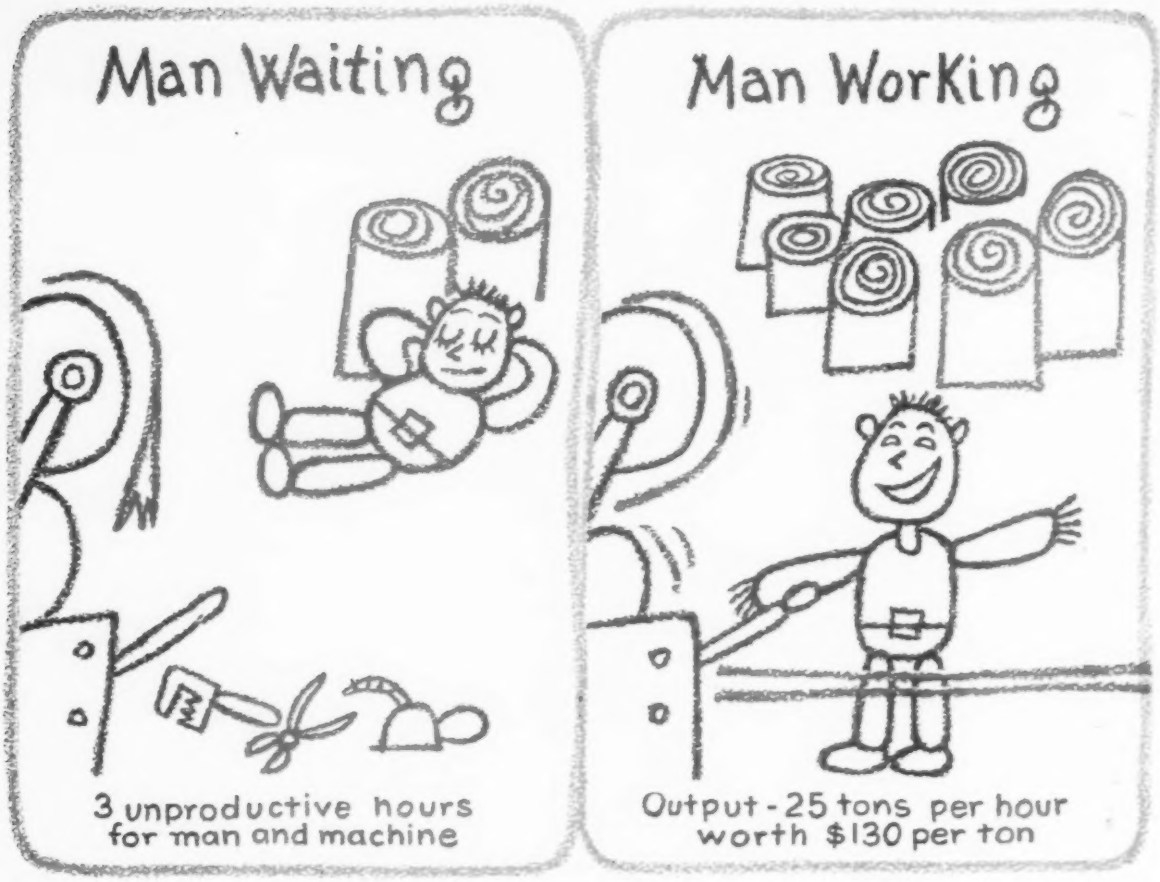


In the past, production losses due to breakdown of dryer roll bearings were so small they could be made up.

Today shut down of high-speed machines puts production behind by hundreds of tons per hour—quickly piles up losses.

Lubricating plan cuts downtime —can save $10,000 in 3 hours

Not so long ago, machines shut down by bearing failure could make up production losses. Today volume output and integrated production mean that production losses are losses in profit. These are the reasons behind management's growing concern with lubrication methods in their plants.

Take this example from the paper industry: they used to figure $500 for a bearing, $500 for labor (idle time and repair crew) and expected to make up losses on the two or three hours downtime. Today, high speed machines produce twenty-five tons of paper per hour worth $130 per ton. You can't ignore $3,000 an hour in production losses. In this case, the cost of the bearing replacement could run as high as $10,000.

Lubrication problems differ with specific industries, but the basic principles are the same. Many companies are finding that the services of a plant lubrication engineer pay off. His services can extend part life, eliminate production losses, reduce rejects, simplify lubricant inventories and otherwise add to income. Some companies delegate lubrication responsibility to engineers or plant personnel who also perform other duties.

In both cases, Texaco's organization of Lubrication Engineers is functioning in all 48 States, as consultants in outlining a practical approach to these problems. A more detailed discussion is available in an enlightening booklet: "Management Practices That Control Costs Via Organized Lubrication." Write The Texas Company, 135 E. 42nd St., New York 17, N. Y., Dept. F-11.

TEXACO

IN ALL 48 STATES

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

For more facts circle 516 on Reader Service Card

It's our recession! So . . .

What Can We Do About It?

OF COURSE, it's an over-simplification to say that the current recession is entirely in the manufacturing industries. Other sections of the economy are necessarily affected. But it *is* true that the biggest part of the drop is in manufacturing.

Manufacturing is where we live—you readers and we editors. So we are all up to our necks in what's happening and vitally concerned about it.

On the government front, the talk is about legislation to "prime the pump." Plant operating managers, like other citizens, differ in their views on the value of federal pump priming. But regardless of their views, there's going to be plenty of it.

But now let's look at the situation in the plant. Maybe it's not smart for us just to sit around and wait for help from Washington—in effect, wait for Uncle Sam to wipe our noses for us. For one thing, there's reason to think that this recession is going to be licked in the market place and not on Capitol Hill. That's what William A. McDonnell, the newly elected president of the U. S. Chamber of Commerce, has recently pointed out. What Mr. McDonnell is really getting at is that buyers and sellers of goods and services determine, in the long run, how prosperous or unprosperous our economy is going to be.

Here's a telegram that expresses perfectly one aspect of this problem. Harold Bugbee, President of Walter B. Snow & Staff, Inc., of Boston, wires:

"Earnestly solicit your editorial support in campaign to urge industrial management relax its suicidal no-expenditures policies. Just-completed survey indicates among our clients alone $30-million in proposals frozen by management refusal to spend. These are not long-range capital expenditures but for equipment and supplies vital to efficient operation, product improvement and cost reduction. Estimate $10- to $15-billion in orders nationally approved and ready to place except for top management attitude. Government spending may take 18 to 24 months to prime pump. Industrial orders could do it now. Let's make 1958 the year we proved our confidence in capitalism."

To Mr. Bugbee's urging we say "Amen." He makes a point that is vital, not only to top management, but to every level of management—and especially to plant operating management. We already are seeing the danger of helter-skelter slashing of budgets and cutting of personnel. We suspect that even this early supervisory and executive morale in many plants is being hurt. We know of a few companies in which moratoriums are being declared on raises for supervisors, engineers, and executives, but which have negotiated labor contracts granting hourly workers' raises. Such tactics are sheer nonsense!

We see the beginnings of alleged programs to "cut out the fat" in which vital staff activities aimed at long-term improvement are being hurt. We're afraid that this type of activity may spread and may result in cutting out bone and muscle that will be sorely missed even a few weeks from now, and certainly next year and the year after.

We can't for a second argue that nothing should be done under the pressures of severe drops in business that some companies face. What we urgently recommend, however, is that the long-term interests of the business be given a fighting chance.

There are, of course, many projects that can be deferred and that may *have* to be deferred temporarily. But let's be careful in selecting the right projects. There are probably people who can be dispensed with under short-term financial pressures. But let's be careful in selecting which ones. There are probably drastic short-term cost reduction projects that can be put quickly underway. But let's be careful that they don't cut the ground from under the far more important long-term projects that so many companies have been working on for some time.

To put it all in a nutshell: What we think is needed now is sound and mature management judgment. We are not convinced that the short-term economic pressures of this recession are any excuse for turning our backs on the very foundation of good management—viewing today's problems with the long-range implications in mind.

Even really serious cost pressure today is no excuse for bad planning, for short-sightedness, for morale-destroying arbitrariness, or for panic. To quote Mr. Bugbee: "Let's make 1958 the year we proved our confidence in capitalism!"

Coming: One More Turn on the Wage Spiral

MONTH	INDUSTRY (or Company)	UNION	DEMANDS	FORECAST
APRIL	Textiles: cotton-rayon, woolen-worsted	Textile Workers	Extension of contract for one year with no wage increase.	**Quick settlement. Industry will accept moratorium.**
	Chemicals (Lever Brothers)	Oil Workers	Wage hike, 8 to 12%. Also: "We are going to move against these spreading layoffs. Will demand employers give us a substantial notice of their layoff plans," says O. A. Knight, president of Oil, Chemical, Atomic Workers.	**About 8¢. Little chance of checking layoffs.**
MAY	Automobiles	Auto Workers	Wage hike, 10¢. Higher SUB benefits. Share-the-profits, and other fringes. "We need a massive injection of consumer purchasing power," says UAW's Walter Reuther. Demands are geared to this.	**Good chance of strike. Final settlement little above 10¢. Higher SUB. No profit-sharing.**
	Machinery (General Motors)	Electrical Workers	Bargain behind UAW, with closely matching demands.	**Will settle after UAW.**
	Aircraft (Boeing)	Machinists	Wage hike, fringe benefits—jointly planned by machinists and UAW. "Special demands must be formulated for aircraft and missile workers—separate from those in other industries we represent," says UAW.	**Pick-up in defense orders would make settlement above 10¢ likely.**

How 1958 Bargaining

THIS is the month when 1958 collective bargaining gets down to business. This year it's serious.

As employer and union negotiators take the long walk to the bargaining table, you can get a good idea of what's going to happen when the get there (forecast above).

Chances are, neither side will walk away happy. Here's the outlook:

Management is going to have to pay higher wages, even in the face of a sludgy economic picture of high unemployment, lower profits, falling production. If business does pick up, labor will cost even more.

Unions are going after costly settlements though they'll trim their demands when the chips are down. But they won't trim too low — they've got some built-in support in the automatic increases coming up through the year (table, p. 86).

The makings of some bitter disputes are in the cards.

By ALAN E. ADAMS
Labor Trends Editor, FACTORY
McGraw-Hill Washington Bureau

THIS YEAR IT'S DIFFERENT

What's the big difference between this year's bargaining outlook and last year's, when strikes and labor disputes hit a post-World War II low? It's the fact that two conflicting forces will run smack into each other in contract negotiations.

At this time of recession, when management might expect to get a payroll break, it runs head-on into the pressure of contracts negotiated in the good times of 1956 and 1957—contracts giving 4-million workers automatic raises averaging 7 to 11¢ an hour. Also most of these contracts provide cost-of-living adjustments that could put the workers' take even higher. These automatic hikes will leave 1.6-million more workers and their union leaders still to be satisfied. Union bargainers through the rest of this year will take their cue from the "built-in" wage increases.

FORECAST: TROUBLE AHEAD

Federal Mediation Chief Joseph Finnegan says, with notable understatement, that bargaining in the months ahead will present a "for-

...says FACTORY's BARGAINING FORECAST

MONTH	INDUSTRY	UNION	DEMANDS	FORECAST
JULY	Farm equipment (Caterpillar, I-H)	Auto Workers	Will depend on how the UAW fares in auto bargaining.	**If no auto strike, quick settlement likely.**
	Trucking (New York long-haul truckers)	Teamsters	Above $5 a week.	**Settlement will be about $5. Teamsters have good bargaining position in New York City.**
AUGUST	Aircraft (Bendix)	Auto Workers	Aircraft bargaining by Machinists in May will set pattern.	**At least as good a settlement as in May. Could be better if economy improves.**
	Farm equipment (Allis-Chalmers)	Auto Workers	Watch July bargaining with Caterpillar.	**Will follow UAW's pattern.**
SEPTEMBER	Glass (Libby-Owens-Ford)	Glass Workers	Will depend on auto negotiations.	**Settlement will hinge on UAW wage gains.**
OCTOBER	Electrical manufacturing (Westinghouse)	Electrical Workers	Employment security — some form of SUB. "There's no reason why, with the help of our union and government experts, the industry can't work out a steady year-round production schedule," says James B. Carey, President, International Union of Electrical Workers.	**Chances slim without a fight. Carey's opinion not shared by industry.**

Will Hit Industry—and You

midable test" for his 220 mediators. In the comparative calm of 1957 they were in the middle of more than 6000 cases.

This year, Finnegan predicts, the "cost-price squeeze" and falling profits will make management tougher. And with labor in a box between the higher wages two-thirds of union members are getting and the wages of the one-third just coming up, the clash could shatter the strike record of the past decade.

Where will the results of this conflict show up first? The United Auto Workers and its president, Walter Reuther, will do the hardest fighting for the biggest demands—and will lead the parade.

This month Reuther opens up with the major auto producers on new contracts that must be reached by the end of May. That's when the industry's three-year agreements, covering more than half-a-million UAW members, run out.

All other union leaders are watching this one. If Reuther gets most of what he wants, other unions will hike their settlement figures. If he falls on his face, he won't be alone at the end of the year.

There's some talk Reuther will be the "whipping boy of 1958." If so, it would be his first time on the short end of negotiations. Don't bet on his losing.

Even so, look at what Reuther faces. His demands would look high if Detroit were selling a car to every man, woman, and child in the country. But his demands come when up to a million new cars are still unsold—when unemployment in the auto territory is hovering around 10%—when thousands of workers are on a short work-week.

This isn't a happy state for the producers. But it gives them a flexible postion. They can say no—and mean it. A strike isn't going to hurt that much. In fact, a walkout would pare inventories and the cost of under-production.

The UAW may be walking into a hornet's nest. It has set its stakes high—certainly with an idea to giving away a lot when the time comes. But union bargainers have to consider the built-in pay hikes that steel, aluminum, electrical, and other workers are going to get. Can Reuther do less for the auto union? The

Where Automatic Pay Hikes Will Hit

MONTH	INDUSTRY (or Company)	UNION	AUTOMATIC PAY RAISE	CONTRACT RUNS TO
APRIL	(Goodyear Atomic)	Oil Workers	8¢	March 1959
MAY	Glass (Glass Container Manufacturers)	Bottle Blowers	2%	May 1960
JULY	Steel	Steel Workers	7-13¢	June 1959
AUGUST	Aluminum	Steel Workers	7¢ or more	July 1959
SEPTEMBER	Metals (California Metal Trades)	Machinists	11¢	May 1959
OCTOBER	Container (Continental Can, American Can)	Steel Workers	7¢	June and September 1959
	Electrical Manufacturing (Westinghouse, General Electric)	Electrical Workers	About 3.5%, with 4.5¢ minimum	October 1960
	Metal Products (Yale & Towne)	Machinists	10¢	October 1959

UAW leader is tough and shrewd—but he's also practical.

The union strategists know to almost a penny how much they can collect. Take steel in 1956. The industry made a last-minute offer of 14¢. USW officials privately decided there was one more penny in the kitty. It took a short strike to collect, but they won it with a walkout. This can be costly for 1¢ per man.

The UAW, as well as producers, can probably predict right now the final settlement figure. But it can't estimate the temper of both sides. If a strike is called, it can't be turned off automatically.

COMING: MULTIPLE DEMANDS

You can find almost as many kinds of demands as there are negotiations this year. But the settlements may look pretty much the same when the talking is all over. It depends, mostly, on the economic picture when settlement time comes.

If recession continues, and industry after industry can show it's in trouble, unions must shift their approach. Basically, they'll go for anti-recession clauses. This means severance pay, supplementary unemployment benefits (SUB), longer vacations and even—or especially—a shorter workweek.

You'll get your cue on any shift in the auto talks. If Reuther talks less about sharing profits and demands a shorter workweek, it means most 1958 bargaining will be to counter unemployment.

In all bargaining, management will be asked first to fork up a wage increase. The UAW sets its figure at 3.5%—about 10¢—to match its estimate of productivity advances. Plus 52 weeks of SUB (double the current rate) and a 15% increase in SUB payments to 80% of take-home pay. On top of that is the demand to share in profits—one-quarter of the top 10% to union members. Plus fringes—higher pensions and health and welfare benefits.

The Machinists want higher wages and severance pay. Electrical Workers are limited to employment security bargaining this year, midway in their five-year contracts, and they'll talk about "guaranteed income" in October. Oil Workers want the right to negotiate on layoffs.

Besides the over-all demands, industrial unions are beginning to feel the revolt of skilled workers. Across-the-board increases in recent years have cut into skilled-worker differentials. Also skilled workers have protested SUB contracts because wage money was given away to secure them. This year, for the first time, UAW is allowing a separate voice to skilled workers, with the right to accept or reject an over-all contract. Already the skilled trades division is demanding a minimum $3.25 an hour.

All told, 1958 demands match those of any year, but the results of bargaining won't. If the emphasis is on recession, unions will give away money for more work; i.e., they'll get a shorter workweek at the same rate of pay. They'll be backed by automatic wage hikes, and this should boost their chances for higher wages. Fringes will continue to show a climb.

But the over-all costs of settlement will depend on how business is doing when it signs the contract. If you picked a figure for the UAW right now—assuming no drastic economic change—it would probably be about 10¢, perhaps a little more; higher SUB; no profit-sharing.

Other settlements will come out at about the same ratio of gains to demands. The average will be lower than the unions are used to, but it will be costly for management in a year when a business slide makes any added cost tough.

CAN YOU HOLD OUT?

Against the unions' demands management has almost as many defenses, but not quite enough to escape unscathed. Those automatic built-in wage increases for 4-million workers are hurting most (table above). They will spur union leaders. Their members won't like to be on the short end of the wage parade.

But countering this will be economic troubles that make strikes look not so bad. As the Mineworkers' John L. Lewis used to say: "It's just consolidating the idle time."

With employers' resistance toughened by economic troubles, they can inject some demands. In the building industry, for instance, contractors have won pledges to put an end to feather-bedding and make-work projects. Other industries will begin to pick up the cue. In areas where management has sought to retrieve more control over the workforce through incentives, seniority adjustments, grievance procedures, and the like, this is the first time in many years that management can move ahead.

In 1958 bargaining management will have to pay. But it's going to give labor unions—which have fared well for the past decade—some come-uppance before it's over. This is the year employers might do well to talk back.

"COUNTRY STORE" brainstorming is a specialty at the five-year-old Westinghouse-Vicksburg plant. Production men, divided into four groups (above is one group), pick products apart inch by inch. Result is a flood of cost-reduction ideas. Vicksburg managers and workers came up with more ideas per man than any other Westinghouse plant last year.

$1-Million a Year in Ideas

WONDER PLANT is the term for Westinghouse's five-year-old Vicksburg (Miss.) lighting equipment factory. People with ideas (photo above) have just about re-done a plant that was new in 1953.

Even though original production facilities were top-notch, every plant area has undergone major changes in operating methods. Even the product has changed. And cost reduction is exceeding $1-million per year.

How is all this possible? FACTORY visited Vicksburg, kept a sharp eye out for some special sort of cost-reduction program. We couldn't find any program. And we couldn't find any visible reason for Westinghouse-Vicksburg's success story—except the people.

Who are they? What's so different about them? Take the supervisors. There are 18 first-line supervisors for 385 hourly workers. Eleven of these 18 are college graduates. Fourteen are former members of the manufacturing and industrial engineering departments. At Vicksburg it's a step upward if a man moves from industrial engineer to foreman. "Graduates" to the line are eager to make cost-reduction changes. Every supervisor undergoes a trial period. There's a high turnover (7.5% per year). Plant Manager W. D. Ligon figures that nobody benefits from a misplaced supervisor.

Then there's the human relations story. Good relations start at the top, permeate the whole plant atmosphere. Supervisors are on the floor constantly. Their role is to help workers solve problems, not to crack the whip. Workers get complete instruction on operations plus advance notice of any changes. Management encourages mixing, talking, friendship.

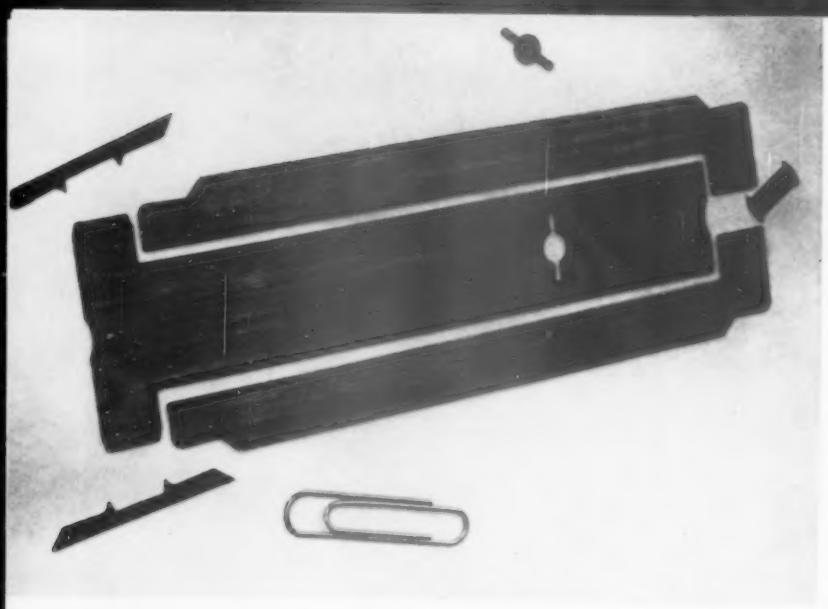
The workforce is willing. Workers—most of them new to industry—are cooperative, ambitious, pleasant, and hard-working. Key to good workers is good selection. At Vicksburg, selection is in the hands of a former town schoolteacher who has an uncommon knowledge of the ability, training, and background of every job applicant. Westinghouse gets the pick of the lot.

Worker training is intensive—done almost entirely by foreman. Workers are paid on a measured daywork plan (rather than by the more common Westinghouse incentive system). Every job is broken down to MTM elements. Supervisors get no allowance for fatigue, unavoidable delay, or training.

Ideas from everywhere—Everyone is encouraged to produce schemes for improvement. And just about everyone does. Vicksburg leads the entire Westinghouse organization in per-capita idea output. One gimmick: country store-brainstorming. Products are set up in each corner of a conference room. Supervisors pick them apart, suggest improvements, fine themselves if they don't come up with at least one idea per man.

A staff employee keeps track of worker suggestions and ideas. Plant Manager Ligon sees that evaluation follows in a hurry. No idea dries up for lack of action. Even suppliers are encouraged to suggest improvements. One supplier worked out a new package for a suggested design. It saved Westinghouse-Vicksburg a healthy $50,000.

Turn the page



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They chop it close, save $188,000 a year

This transformer lamination used to take 25% more material than it does now. Old design wasted 29% of material. New design wastes only 4%. (See four small pieces of scrap. Paper clip shows scale).

Design and tool engineering teamed up to lower scrap percentage. Old design had no superior electrical characteristics.

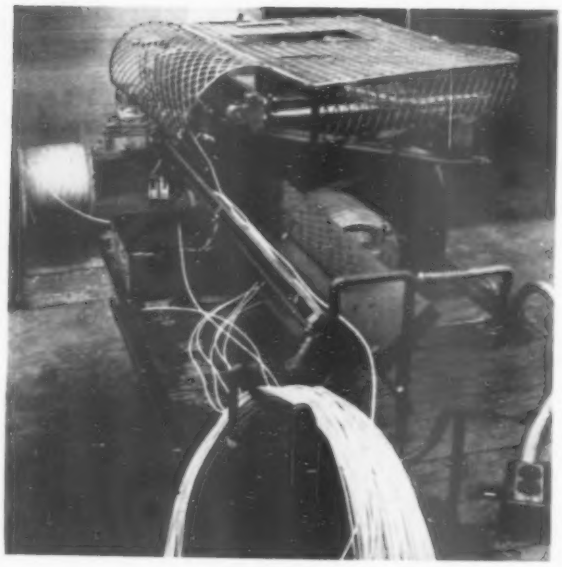
Vicksburg idea men poured out more than one idea per worker last year.

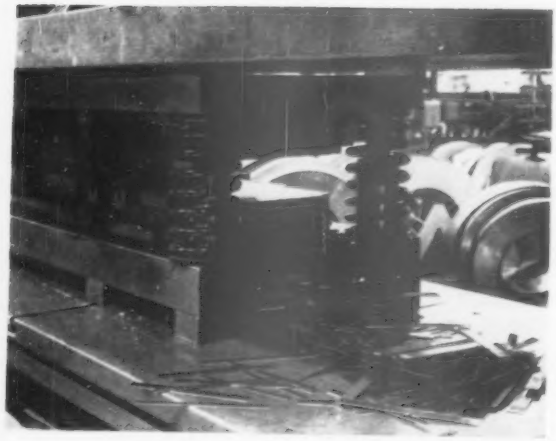
V-trough cuts out "spaghetti"

White strands of insulated lead wire used to come off this automatic cutting machine jumbled like spaghetti. Took time to straighten out the mess. New V-trough catches cut strands as they come from machine, holds them until blade slices wire, then opens to drop cut wire onto neat pile in foreground.

Idea for new trough came from industrial engineering department during a routine study of the operation. And now Westinghouse-Vicksburg gets almost a 100:1 return on the $25 it spent to build the trough.

Annual savings: $2050.





Truck springs keep dies open

Here's an answer to the high cost of set-up and adjustment of stamping dies. Heavy-duty truck springs hold dies open. Set-up is simple. Die set is put on press bed and base is bolted down. Top floats free. You can see daylight between the top of the die set and the press ram. Alignment is maintained by four-corner slides of the set. Slides are lined with ¼-in. ball bearings to reduce wear.

No more riveting for these capacitor terminals

Three terminals are assembled to every capacitor top. The old way of doing the job was to rivet the terminals onto the lid.

New way is to weld the terminals to the can cover. This method reduces component size, speeds assembly, and cuts the reject rate by more than half.

Plant design engineer recommended the idea. Manufacturing engineering department developed the method with the help of Westinghouse-Vicksburg's welding equipment supplier. Saves $1700 a year.

One special steel formulation replaces three grades

Fluorescent fixture egg-crate louvers originally required three grades of commercial steel.

Full hard was used for the louver blades to prevent warpage and distortion. Half hard was used for a V-type center channel that holds the cross blades in place. It had to bend into a V, yet have enough spring to hold the cross pieces in place. Soft steel was used for connectors and hardware.

Brainstorming session repeatedly came back to the question: "Why three grades of steel?" Vicksburg went to Tennessee Coal & Iron Co. with the problem, and that company developed a special "full hard stress relieved annealed steel." Results: one grade does three jobs now. And saves $57,000 a year.

Winding goes semi-automatic

This is one of four new $9000 machines that wind capacitors by themselves. Vicksburg used to use a manual start, stop, and cut-off of the aluminum foil and tissue paper winding. Now workers only have to insert two small conductors in the winding and unload the machine. Machines were developed by manufacturing and product engineers with help of Westinghouse laboratory. Annual savings: $124,000.

Turn the page

Begins on page 87

Seams replace solder

Capacitor cans take their cue from can manufacturing. Capacitor containers now are sealed just like a soup can—with a double-rolled edge.

Old way of sealing cans was to solder them in an induction machine. New way lowers component cost, reduces rejects by 75%, cuts labor costs, removes the usual high maintenance cost of induction solder machines.

The manufacturing engineering department came up with this idea. Cost of new equipment: $1800. Savings in a year: $4000.

Cold roll steel replaces enameling iron

Manufacturing engineers had their ears wide open when a frit supplier said, "Present grades of cold roll steels are superior in quality to the enameling iron sold 10 years ago." Westinghouse had just seen a successful drop in the temperature used in enameling.

Westinghouse put two and two together, came up with proof that cold roll steel would do as good a job as enameling iron.

Result: a switch to the cheaper grade of steel.

Annual savings began to mount. Now total $40,000 in material cost $500 in fuel required to heat the porcelain furnaces.

Zigzag goes straight

Egg-crate louvers for fluorescent fixtures are welded on a bench that holds longer horizontal pieces while shorter vertical pieces are inserted. Bench and louver move into welder, which welds two rows per stroke.

Old set-up—Two benches, one on each side of welding machine. Assembler at each bench fed assembled louvers alternately into machine. Indexing was manual.

Constant attention to the welding operation was a must. Two assemblers tried to stay out of phase.

New way—Straight line assembly. Five benches work from left to right, feed into only one side of welder. Welder indexes automatically. After welded louver exits at far side, empty bench slides under work rails, rides back to far left section of unit, automatically rises to work position.

Manufacturing engineering and machine supplier had the idea. Cost: $41,000; saving: $11,000 per year.

Waste paint covers walls

Some of the overspray from component painting operation can't be salvaged because it's no longer pure white. The casual observer can't tell the difference because the percentage of non-white contamination is quite low. But even 1% of another color is too much to be used again in production.

Westinghouse-Vicksburg came up with this idea for re-using overspray: Add a pleasant blue-green pigment and use waste paint in office and other plant areas. This was the maintenance supervisor's idea. It pays off to the tune of $700 annual savings.

Another smart idea: Recovering porcelain frit overspray saves Vicksburg another $51,000 a year.

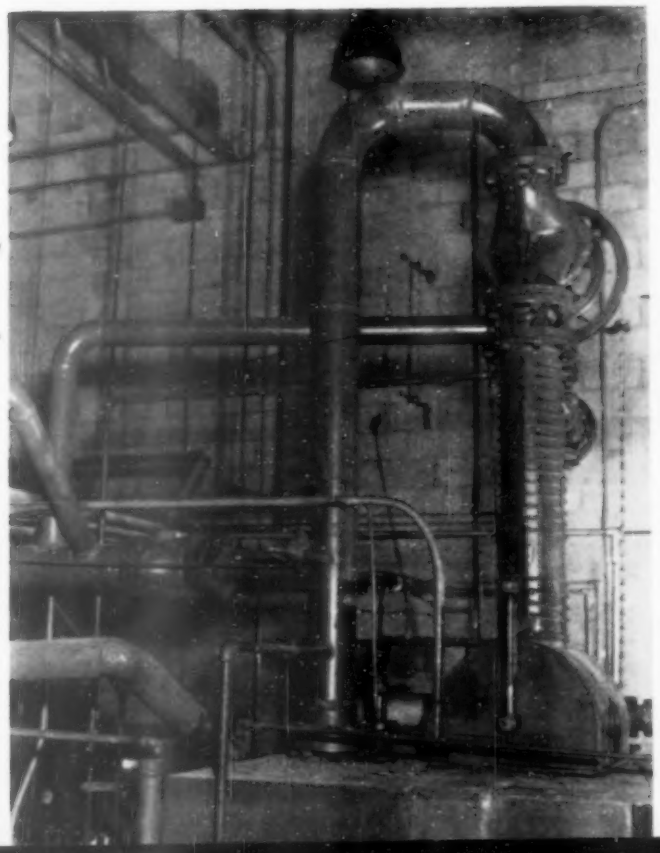
The general supervisor of porcelain enameling along with the industrial engineering department came up with the idea of scooping up overspray and using it for a base coat.

New paced conveyors save $37,000 a year

Luminaire and ballast assembly used to be a bench operation. Conveyors carried units from one bench to next. No one thought a straight-line conveyor could work. But the industrial engineering department thought differently.

Management decided to replace both assemblies with a paced final assembly conveyor. Cost: About $10,000.

Decision was based on close analysis of each operation. Employees got full explanation of change, plus plenty of supervision during transition. Result was that worker output has risen 76%. Annual savings in final assembly are $20,000; and in ballast assembly, $17,000.



Boosters cut drying cycle 35%

Canned capacitors are filled with dielectric oil. Before filling, though, paper and foil contents must be thoroughly dried. This is done by heating the capacitors in a vacuum unit. Vacuum and heat must be held for hours because the only vapor escape opening in the can is a 0.0625-in. hole in the top.

Adding boosters to the vacuum-drying and impregnating equipment reduces the cycle time an average of 35%. Boosters increase the volume of air that can pass through the pumps. Tank's moisture is more quickly dissipated.

Both high-voltage breakdowns and power-factor tests have proved that the quicker drying system produces a superior product.

After drying, capacitors are filled with dielectric oil and sealed with solder.

Savings: $1500 a year in operating cost plus $62,000 in equipment cost for the present capacity (when compared with cost of obtaining same capacity by adding more impregnating tanks).

Next step is to pre-heat capacitors to 130 F. before they go into impregnators. This plan will cut the impregnator cycle another 10%, save an additional $800 per year in operating cost.

On roof above Small individual units, installed on roof, send cooled air throughout all plant areas. Under the V-roof, the air goes to ceiling outlets, which are spaced 35 feet apart in each bay.

In workplace below Outlets you see below distribute cool air evenly to all work areas. Other parts of the plant are cooled from a 1200-ft. air distribution manifold above the false ceiling.

Air Conditioning for 36% Less

Coming soon: torrid weather. Now's the time to think about comfort cooling. This smart system will give it to you where you need it—at a price that's right.

COOL and comfortable—that's the story of our Lenkurt Electric Company plant at San Carlos (Calif.). And we did the job of air conditioning for $1.75 per square foot. That's well below the $2.75 psf. a conventional system of equal capacity would have cost us.

How did we do it? We installed 68 3½-hp., two-stage, air-cooled units on the roof of our 88,000-sq. ft. plant (photos, facing page).

Management gave us the go-ahead in the first place on condition that we could justify air conditioning in dollars and cents. It wasn't easy. We're on the breezy San Francisco peninsula, where temperatures get to 95 F. only a few days a year, 80 to 90 F. a few more. Most summer days are in the high 70's.

Yet we pointed out that increased efficiency of office and plant workers—plus the strong appeal of air conditioning to prospective employees—was important. Also, air conditioning promised relief from humid sea breezes. A fourth—and important—factor: Air conditioning today insures us against losing employees to new air-conditioned plants tomorrow. But even these arguments fell on deaf ears until we could show top management costs were in line.

WEIGHING OUR PROBLEMS

No matter how we looked at it, our building presented a problem for any air-conditioning system. Construction is unique. We have a multiple-unit Butler-type building with four parallel peaked roofs. Our building forms a core of 40,000 square feet encompassed on all four sides by a flat-roof, steel-frame structure (added four years later) measuring 40 and 50 feet wide on opposing east-west and north-south sides respectively.

Entire building is surrounded by concrete tilt-up walls, 23 feet high. There are only east side window openings. The newer flat-roof portion has a 13-ft.-high Sylvan-Aire luminous plastic ceiling. Original peaked-roof section has a similar 11-ft. luminous ceiling. Both roofs were glass-fiber-insulated from the start. Distance from false luminous ceiling to underside of flat roof is 90 inches—to ridge of Butler roof, about 8 feet.

Total calculated heat load would take 200 tons of refrigeration. We figured to hold the temperature down to 72 F. on moderate days and 10 degrees below ambient on warmer days.

FINDING THE ANSWER

The bids received on conventional water-cooled systems (averaging $2.75 per square foot) put us on the trail of small air-cooled units. Assisted by a local sheetmetal contractor, we came up with our present system. We found it was feasible, lower in cost, effective, flexible.

Gains added up—For example, if one or two units break down simultaneously or need to be shut down for maintenance, effect on room temperature is slight. Maintenance men can service the units without getting in the way of production. We need no water supply. Another point: Because of high sidewalls, no roof equipment is visible from street to mar building appearance.

Perhaps the least appreciated but most impressive benefit is the excellent performance of the entire system. It's due largely to design. Forty-four of the 68 Vornado units are fairly evenly spaced around the flat-roof perimeter section of the building. These all discharge into a common 22-in. air-distribution manifold 1200 feet long that encircles the building above the false ceiling. From this plenum (at about 10-ft. intervals) take-off pipes extend through the ceiling close to outer wall to 4x14-in. wall-mounted diffusers. From each diffuser cooled air is directed to the center of the building. Angle of throw (20 degrees from horizontal) creates no draft. Yet because of its 800-fpm. velocity, the incoming air picks up enough room air near its exit from register to cause circulation near the wall. This manifold design is working so well it is being adopted for two new buildings under way.

What about air above the ceiling? This wavy type of ceiling has openings along the corrugated edges through which air can pass. To supplement these small openings (about 4%), we placed a perforated Masonite border along the inner perimeter of the newer section. Purpose was to scavenge the heat of the fluorescent light tubes and ballasts so the ceiling wouldn't act as a radiant panel during warm weather.

The system is adjusted to recirculate 80% of the air. The other 20% is exhausted through roof vents. All 68 units in combination (1500 cfm. each) give six changes of air per hour with the blower running continuously, whether cooling is called for or not.

Because of our peaked roof the manifold idea couldn't be used for the center core of the building. Here 24 cooling units are mounted in the valleys. Air is piped from each unit to two ceiling outlets about 35 feet apart in each bay. This gives us even distribution of air.

By DONALD W. GRIDER
Plant Engineer
Lenkurt Electric Company, Inc.
San Carlos, Calif.

THAT'S WILLIAM FERGUSON in the photos above and below. He's manager of electronic data processing for The Carborundum Company (Niagara Falls). He's telling the story (here and on the following pages) of Carborundum and its computer.

Here at FACTORY we think this is the most important computer story yet to be published for plant management. Why? Because it . . .

. . . Starts with a concept of computerization that makes sense.

. . . Explains the problems Carborundum had to face—the ones you, too, will have to wrestle with when you launch your own program.

. . . Shows how a pacesetting company set its goals, created its program, ironed out kinks.

Ferguson is not a computer engineer, technician, or programer. He did study computer programing and operation with others on his staff when the project started. But his job is to manage and administer—to know what the computer can do and what the company wants it to do—and supervise those who can do it.

Ferguson tells the Carborundum story in an exclusive interview with Robert S. Rice, FACTORY's industrial production editor.

How to Make a

Here, in the words of a pioneer in electronic data processing, are the why's and how's, the pitfalls and gains, of computer uses in a not-too-big company. His story (below) will alert you for the computer that's in your future.

A COMPUTER is like an automated production line—not like a general-purpose machine tool. You've got to plan your processes, analyze your costs. Takes time. And there are problems. But the results can be rewarding, as we've found at Carborundum.

Today the big facts about computers are these:

. . . *Computer* use is booming. Less-than-giant-size companies (like ours) are finding benefits in them.

. . . *Time* is needed to plan computer installation and use—if you want to avoid results that are somewhere between failure and success.

. . . *Now* is the time to start looking into computer uses—before your competitors leave you at the post.

"Carborundum isn't a tremendous outfit"

We employ about 7500. Had sales in '57 of just a little over $100-million. But we use a computer in three divisions—Coated Abrasives, Bonded Abrasives, and Electro-Minerals. These three seemed to offer best prospects for immediate gains in better customer service and reduced costs.

Twelve district sales offices and warehouses, coast to coast, serve these three divisions. Each warehouse stocks big volumes of 27,000 products. Inventory control, embracing all 12 warehouses, lists over 47,000 items. Yet we still don't call ourselves a giant company. In other words, it wasn't size that brought us to a computer to solve our problems.

"Lower administrative costs, better information faster, more dependable management controls"

In 1953, Gen. Clinton F. Robinson, president, began to study what computers could do at Carborundum. He saw so many prospective areas that he set up a research fellowship at the Mellon Institute of Industrial Research (Pittsburgh).

As he has said, he had three basic reasons:

. . . *Ever-mounting* administrative costs. Could computers arrest that rate of increase?

. . . *Tremendous* need for better and faster data. We had a large tabulating set-up. But even that didn't give us types of control information fast enough or complete enough to provide top management, division managers,

Computer Work—and Pay Off

and second-line management with the right information to make decisions. Many decisions had to be made "by the seat of the pants."

. . . *Need* for better control mechanisms.

"Payoff: not immediate cost cuts—but benefits that can't be measured in dollars at the start"

First uses were outlined to the board of directors after a two-year survey—in September, 1955. The economics and intangibles were spelled out. We did not put a price tag on intangibles. But if they are realized they can bring improved earnings. For example, better inventory turnover.

But we did look, too, at the savings that could be calculated. The economics were based upon savings in two main areas: first, reduction of tabulating equipment and the personnel running it; second, a reduction in the clerical cost of order processing.

"You can take your choice—broad-scale application or bit by bit"

We had to make a choice: The broad systems approach. Or bit by bit. Many companies that look into this thing already have a punched-card system. So they try to translate what is already mechanized onto a computer. But we had a very "unmechanized" system. So, with management wanting to get operations under control—to cut costs—the only practical approach was across the board. We looked at it as a long-range—5- to 10-year—program to mechanize all administrative processes.

We set up the Mellon fellowship early in '54. Then we set up an electronics committee—branch managers of interested operating and staff divisions. Their work was coordinated by George J. Zimmerman, who later became company controller. They made a joint survey, with the technical part handled by Mellon.

"Planning begins at the front door of the business—the customer's order"

After all, most administrative processes stem from the customer's order. We felt that if we could mechanize that part we would have built a strong tree trunk, from which other administrative processes could branch off. So we started with order processing and related finished-goods inventory control. Notice I said finished goods—not work in process or raw materials. Along with that we decided to put onto the computer system certain tabulating operations that were adaptable to computer processing—such as payroll, sales and cost of sales reports, salesmen's commissions, and that sort of thing. Heretofore, some of these had not been tabulated.

"Payroll processing is only a small part of the picture. Payroll handling alone won't pay off"

We are not large enough to justify our type of computer for payroll handling alone. It takes more than our 7500 employees to do that. But we did put the payroll on our computer as a part of phasing out tabulating. We did not expect any direct payoff.

"Takes a battery of diverse equipment to get a data-processing center going—and keep it going"

Taking the equipment pretty much in order of operations, we have . . .

. . . *Flexowriters* as the basic machines to record source data, create input paper tape to the computer system. They're in our sales offices and plants.

. . . *Teletype* equipment for sending and receiving information, by punched paper tape, between Niagara Falls and our district sales offices and plants.

. . . *Tape converters*, first of their kind (by Remington Rand), to translate data from paper tape to magnetic tape and *vice versa*. They permit direct two-way communication between teletypewriter net and computer.

. . . *A computer*—Remington Rand Univac I, a large, general-purpose machine.

. . . *High-speed printer* to convert Univac's information to readable form.

"Takes people, too. And you can't always know, in the early stages, how many you'll need"

In procedures and programing we've got 16 people. It's hard to determine in the early stages how many people you'll need. Actually we could probably use more people than we've got. But long range, we see a stable outlook for the group we have today.

"The gains get into time, accuracy, control, inventory, forecasting, and planning—and intangibles, too"

We find the company has made substantial gains on various fronts, as follows:

. . . *Reduced* order processing time.

. . . *Current* company-wide inventory data.

. . . *Better* inventory distribution.

. . . *Fewer* clerical errors.

. . . *Positive* control of orders in process.

. . . *Faster* inventory turnover.

. . . *Better* forecasting and planning.

One of the basic objectives was spelled out at the start: Develop a truly mechanized, integrated system. That way, we didn't find ourselves, in the end, with a lot of unrelated applications. By starting at the front door of the business, on a truly integrated system, we built a foundation for further mechanization of ad-

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ministrative processes. More applications are going to flow from what we have today—with intangible as well as measurable benefits.

We didn't expect net savings right at the beginning, because we had to take a broad approach. In fact, we can't expect to break even until the third year, with modest savings thereafter. So it will be some time after that before we can recover our initial costs.

"Recruit and train an organization for data processing —from within the company"

Approval by the board of directors came in September 1955. That's when we established data processing as an organizational entity.

The first thing we had to do was to recruit and train an organization. We recruited from within the company on the principle that it's easier to teach a Carborundum person the operation of the computer than to teach a computer expert the operation of the company. So we gathered our organization from our methods, tabulating, accounting and industrial engineering departments. The people in tabulating were quick to pick up computer application.

Training a man just to become a beginner in computer programing takes about six months. First, Remington Rand schools took about three months. Then we gave our people another month's training in some specialized programing techniques we were going to use. These techniques were developed by Dr. Grace Hopper's research group of Remington Rand. Their main advantage is that they permit breaking down a problem into smaller pieces—operations—and programing each operation. Then the computer takes all operations and puts them together as a running program. This system speeded up our programing effort. Our people got a month's instruction on that system, and then we gave them their first problem to work on—a simple problem that would take about two months.

We used the salary payroll as a training ground. It was already mechanized on tabulating, so was easy to define for programers. As they completed their schooling we gave them programs to write on salary payroll.

"To reassure our people about coming changes, we held group meetings and individual interviews"

During the organizing we gathered the tabulating group for a meeting. Our policy was to be completely honest with them. We explained that the program was long range, would take several years to effect, would be done in phases—not overnight. With help from industrial relations we explained that normal turnover should in total resolve any personnel problems.

We followed up this meeting with individual interviews. Present at each interview was one representative each from industrial relations, data processing, and tabulating. We quizzed the individuals on their plans and expectations and on their interest in the new program. We told how we planned to make the changeover—fill some jobs in the new organization with temporary people but hold the openings for our own people until they could be switched over. We told them that as we drew on them for new jobs, we would replace them with temporary people in tabulating.

So there was complete understanding at all times—no friction, no hard feelings. Actually tabulating was integrated into data processing right at the start, so we had one solid program and worked together on it. In fact, at this date all regular employees who are still in tabulating have spots slotted for them in data processing —and the ones who do not are temporary employees, who know they're temporary. We're happy with the way this has worked out.

"Push the job along on schedule and solve the problems arising from the change"

We set up an electronic data processing committee shortly after General Robinson authorized the Mellon fellowship. It included 12 regular members representing manufacturing, finance, sales. It met regularly and often during development and installation of our program. Its objectives were to see that the job moved along on schedule, to help solve any problems.

Getting policies set up was one of the major functions of this committee. For instance, what was to be the sequence for searching other districts for stock to fill, say, a Detroit order? We could program it. But somebody had to think it through, spell it out, put it in writing, and get agreement.

Also, in writing procedures we naturally worked very closely with district managers. A three-man team of them worked with us. They went through the first draft of our book paragraph by paragraph. Believe me, they tore it apart. Then we sat down and rewrote the book. Then we threw it out to all the office managers—and again rewrote major parts of it.

"Coding is only one-quarter of the programing job. Three-quarters of it is defining the system—down to its finest detail"

Another major task in '56 and the first half of '57 was to define the problem and program it. The coding I'd guess to be only one-quarter of the programing job. Three-quarters of it is defining the system. And for a computer you must define it down to its finest detail. When the computer runs across an exceptional order, unless it has been told how to handle it, it will give up in disgust or give the wrong answer. So writing the procedure is the hardest part.

Before we could start programing order processing we had to write the book. It took about 270 pages just to tell how to put the data into the computer. That book doesn't even talk about what the computer is going to do. It just sets forth the policies and describes types of orders you can get—regular, special, emergency, trial, replenishment. Types of codes, different ways of handling special instructions, and all those things have to be spelled out in detail.

We were naive to start with. We thought, "Well, here's our system. All we have to do is write a few program instructions and away we go." But we were told right at the beginning by Remington Rand—the best advice we ever got—"We'll help and guide you, but you must define your system and then program it yourself because that's the only way you'll be able to build on this system and refine it." Today, as a result of that advice, we feel we have a systems and programing staff second to none. We had to learn the hard way.

"More problems—product numbering, customer information, and a common language for processing data"

The third part of our job was pioneering—creating and recording master file information for machine processing. We needed these data on prepunched paper tapes to write orders on the Flexowriters and on magnetic tape to use in the Univac.

Carborundum didn't have a product numbering system. Everything was in description and specifications. So we had to build a system. That's a major task independent of relating it to a computer system. We had to set up a temporary organization to create those master product and customer files.

First we developed a product numbering system—a joint venture of the Mellon people and our electronics committee. Then our operating divisions had a real job of assigning numbers and recording descriptions. Of course, before they could record descriptions we had to prescribe a standard method so the name of the commodity would appear in a certain place and the specifications would always be expressed in a standard way. That was a sizable task.

We installed the product numbering system a year before we started on the computer. We got that system out of the way first so our people could get used to it before they had to worry about using it on the computer. It's surprising what an educational job it was to get people used to thinking that a number meant a specific product and that any time any one of its many specifications changed, it had to be a different product with a different number.

Also we had customer files that we used on our sales reports and tabulating. But they didn't have the detailed information we needed for an order-writing and invoicing job. So we started over from scratch, getting all the information right from customers' orders—even down to the exact number of copies of invoices required, for instance.

We had to get all this information on paper tape and on magnetic tape. Furthermore, much of what we wanted on magnetic tape we didn't need on paper tape. Yet we had to be sure that the same name and address, for example, that was shown on paper tape was identical on magnetic tape. We decided, after working in detail with equipment manufacturers, to set up a punched-card operation so we could convert from cards to paper tape (equipment was available for this) and then use the same cards to go from punched cards to magnetic tape. In doing that, we had to devise a common language for all components—key punch, card-to-paper tape converter, Flexowriter keyboard code, teleprinter system. And we had to make sure that what came out at the other end of the Univac was just what we had intended it to be.

Well, that was a massive job—and we underestimated it. We punched over a million tabulating cards and produced about 250 miles of paper tape that had to be cut into lengths for individual products and customers, folded, labeled, put in little plastic holders, and distributed to the field. The magnetic tapes produced from punched cards had to be put through 32 computer runs—one-shot runs—to set up the files the way we needed them for our computer process. That job ran into more roadblocks than we had expected. For example, in seeking correct customer information we found that some of our districts had only 60 to 70% of their customers cataloged. Right in the middle of cataloging we had product and price changes. (We weren't yet geared to have the computer-maintained automatic file we've got today.) So we'd have thousands of items set up under one price only to find they were out of date even before we could get them on magnetic tape.

But there's one good thing—amazing, too—about the job. Those paper tapes are highly programed, with a lot of computer sentinels in them, and we had to decide on the format for the tapes early in the programing game. Believe it or not, we have not wanted to make even one change in those tapes.

"Still more problems—a high rate of error in input data and some errors in pricing"

We put three districts on the system at first. And we had intended to continue installation through the fall to get almost all field sales offices on the system by the end of '57. But we ran into some debugging problems—not just computer debugging, but over-all system problems. So we halted installation to do a clean-up job in the last quarter of '57.

For example, our error rate on incoming data was too high. For direct input to a computer all information has to be carefully formatted, digit by digit. First runs on the computer test the validity of input data. If the data aren't right, the computer will reject them. We were running close to 20% rejects each day. We weren't equipped at this end to handle that high a volume of

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error output and district offices weren't equipped to handle data corrections. So we built up a serious backlog—three to six days to get errors corrected and back into the system. We just didn't yet have the speed and efficiency we needed. But now the error rate is down to about 5%, and corrections are handled on a daily basis.

Another example: When we started out we were doing a detailed audit of every invoice. There we found lots of errors. We had price errors in our master files in spite of all the checking we had done. Even with the computer, some pricing information has to be transmitted with the order. That was another source of erroneous billing. It was November before we reached an error rate low enough for the auditors to discontinue a detailed audit of *every* invoice.

"Takes a while to smooth out programs and do computer jobs in time you allot for them"

Our processing time was much too high to begin with. When we first started, in fact, a job that we expected to take 8 hours was taking 15, 16, 17 hours. And we didn't see how we were ever going to get all districts on and do it in the time we had allotted.

That was mostly because the programs were not smoothed out. Some of them were so unsophisticated that they were taking more computer time than necessary. But there's a lot to be learned in the daily handling of tapes—in getting run-to-run controls and speeding up. We have now cut running time in half and are doing the job for three districts in 8 hours. We are looking again at certain areas and we can see other savings. We know now we are home free to do the job in the 8-hour shift we allotted at the start.

On Remington Rand's advice we started out not trying to be sophisticated—just doing a straightforward job, maybe going the long way around, but making sure we got there. Then, as we gained proficiency in operating and programing, we consolidated our gains, reduced our running time. We devoted the last quarter of '57 to that kind of clean-up job.

"Some growing pains, some resentment. But the computer system is highlighting some inefficiencies"

In a business where operations were formerly decentralized but where the computer system is now the core of the operation, people are beginning to realize that mechanization means standardization. Practically everything they have to do or want to do must be checked with us.

In this situation you can expect people to feel the machine is running the business—the tail wagging the dog. These are "growing pains." Correcting all this takes time—to revise systems and help people understand what a computer can do for them.

But you have to do a selling job with managers—show them you're doing a real service. The last half of '57 we got lots of complaints. But now we've turned the corner. People are coming to me and saying, "Can't you get this one on faster? Let me get on first. I've got a problem here." In other words, line managers are beginning to see advantages.

The committee has helped, too. Not so much as a committee, but in daily contacts between data processing and individual members of the committee. They were in on the project at the beginning and know some of our problems. Their cooperation has been marvelous. There's been no hesitancy about going ahead because, I'm proud to say, our line management is so aware of the company's objectives that it really wants to see this thing work. Of course, we're a staff organization and a service organization within staff. We have to sell our services to the divisions.

"Give our customers the kind of service they have a right to expect"

In setting up our mechanized system we followed two basic principles that would speed our own work and give our customers the kind of service they have a right to expect. Here are those principles:

. . . *Complete* the entering of a customer's order at the point where it's first received—the district office. Give the district office all information needed for a complete editing job on the order—and give it full responsibility. The district office is closest to the customer. It should know his problems better than we do here at headquarters—in Niagara Falls. If there is any question about what he is ordering, the district office can get the answer.

. . . *Mechanize* recording as much as possible at that first point. We provided each sales office with sets of prepunched paper tape for the customers it serves and with prepunched tapes for products it stocks. We eliminated the repeated copying by hand of customers' names and addresses and of our complex product descriptions and reduced to a minimum the variable information that had to be entered by hand.

"Four basic files for the computer system—customer, product, inventory, and orders in process"

Today an order is recorded by the Flexowriter. We get a paper tape via teleprinter. It is converted to magnetic tape, goes directly into the computer.

Here at Niagara Falls we maintain four basic files on the computer. First, there is a master customer file that includes the customer account number and name and address, as well as all other information we need for subsequent processing.

The second file is the master product file. Magnetic tape files here have price data, specifications, a code to tell us what plant makes the product, and cost information to produce cost statements.

The third file is finished goods inventory—by product number, by location, by what's on hand and on order, and on back order. As orders are run across these files, the inventory is updated. The computer automatically searches other district inventories for items that may be short in the first district.

The fourth file is of orders in process. Every open order is stored here. As shipments are made we get a teleprinter message from shipping location, keyed by order and item number. The computer processes the message to the writing of an invoice.

With all this data processing, we have on magnetic tape complete information about inventory and sales.

"Our new system puts us far ahead of the way we used to handle customers' orders"

Look at order entering the way we used to do it. The customer's order would be received at a district warehouse, then would be run across that warehouse's manual stock record cards to see what items could be shipped from that stock. The district office would censor only the items it could handle.

The district office would photocopy the order if there were items that had to be handled by somebody else and mail it here, to Niagara Falls. Finally we would write an order to ship from plant stock or to manufacture. It would take anywhere from a week to two weeks to get an order entered in the plant. Without central inventory information we didn't know whether an item a Cleveland customer wanted was in stock in Detroit or Pittsburgh.

"Gains from a central inventory that's updated daily: better forecasting and planning"

With our central inventory updated daily, we can produce complete and timely reports that lead into improved forecasting and planning. With our high-speed computer and complete sales and inventory information, we can produce the type of data we need for planning. Without this information in the system to use for production planning and decision-making, we think we'd be putting the cart before the horse.

That brings me to decision-making. Our computer system helps right down to the department manager's level. Some day—if we keep on making progress—we hope to help the foremen as well.

"We have to do this to be competitive. If we weren't, eventually, I believe, we would be forced to it"

With the problems of improving operations—or the solutions we are trying to reach—it's doubtful we could have reached them by just expanding tabulation. Tabulating people might take exception to that. And it *is* a little hard to be conclusive about it. But with our goal of solving our long-range growth problem in the administrative area, it's a question of how long we could have avoided an over-all, integrated electronic data-processing approach. Competition, I believe, eventually would have forced us into it. Now, perhaps we are a little ahead in the game.

"Be prepared to keep the system going when a breakdown stops your own equipment"

Equipment downtime is critical—just as it is in the shop. For instance, we normally enter shop orders within 24 hours after receipt of the customers' orders. So far, our equipment has proved reliable. But we did have a 3-day power outage. You must provide for that. There are several answers:

. . . *Commercial* computer centers that will process data for a fee. But scheduling is a problem if too many companies have emergencies. Also, distance to a center with compatible equipment is important.

. . . *Other* companies with same equipment. They're usually willing to help. We have done a little work for others on our computer, and they have helped us.

. . . *Standby* equipment, including a power generator. One scheme is to have two smaller computers instead of one big one. But that's oversimplifying. Besides the computer, other equipment such as tape converters and high-speed printers may stop the system.

Our current solution is in the first two answers.

"Ahead—bigger plums: inventory controls, automatic stock replenishment, better sales analysis, mechanization of major administrative procedures"

We've got our work cut out for us. We hope to complete the installation of the order-processing system by the middle of '58. But when we reach that point we'll only be doing an inventory record-keeping operation—not an inventory-control operation. So our plan for the last half of '58 is to gear ourselves for some advanced inventory-control techniques.

There are projects underway now to develop policies and plans, working with our operations research people. We plan to have the computer lead us into automatic stock replenishment of our district warehouses. We feel that with central inventory information on the computer and with proper mathematical models and policies established, the computer can do the replenishing—maybe not for all items but for the bulk of the items. We want the computer to consider not just one district, but the over-all inventory picture of any item throughout the country. If we can get started on some of these inventory-control techniques by the end of this year, we'll be happy.

Where we go from '58 is only a question of where the biggest plums are. Our 10-year aim is mechanization of all major administrative processes.

FACTORY
MANAGEMENT AND MAINTENANCE

IDEAS OF THE MONTH

By LEWIS K. URQUHART, Executive Editor, FACTORY

(For more information, circle item numbers on Reader Service Card next to back cover)

Little Dickie happens to be a low-priced, foot-operated hydraulic lift and transport truck *(Langley Mfg. Co.)*. Will handle lifting and positioning jobs up to maximum weight of 750 lb., maximum reach of 65 in. off the floor. **(291)**

As for files for the plant office, give us the rotary kind *(Diebold, Inc.)* with Dial-A-File control. Makes finding records easier than dialing a phone. Just one flick brings records to operator's finger-tips. **(292)**

We'll also cast our ballot for "Activisible" record packs *(Acme Visible Records)*. They turn any drawer into a visible record file. **(293)**

Here's a workhorse for metal fabricating plants: It's a floor truck *(Rol-Away Truck Mfg. Co.)* designed to carry bar stock, tubing, extrusions and shapes, boxes, cases, etc. Secret is rigid, retractable fifth wheel mounted under center of truck. Flip of foot lever locks wheel in contact with floor. Truck can now be moved easily in controlled line of travel. **(294)**

Condumatic is a new pipe bender *(Simes Co.)* that will make life much easier for your maintenance electricians. This 160-lb. electrical machine will bend steel or aluminum conduit from ½ in. to 2 in. in diameter on radii from 2½ in. for smaller sizes to 5 in. for larger diameters. **(295)**

Microfilm projector *(Keuffel & Esser)* will give you rapid, sharp, distortion-free, 8½x11 enlargements from 35mm film on low-cost diazo paper—at about one-fifth the cost of enlargements on silver emulsion paper. (K&E has bigger models coming up later.) **(296)**

Speaking of microfilms, you can make dry-contact duplicates of card-mounted frames (and keep master files intact) with Uniprinter *(Filmsort Co.)*. Time: less than a minute—under ordinary room lighting. **(297)**

Videne is a clear plastic coating *(Goodyear Tire & Rubber Co.)* that needs no adhesive backing. Can be applied by pressure as a surface for plywood, metals, paper, other plastics, cloth. Goodyear says it stays tight and smooth even while coated material is being cut and shaped. **(298)**

No electrocutions with a new ladder *(Hopfield Industrial Mfg. Co.)* because it's made of glass-fiber-reinforced polyester resin *(Reichold Chemicals, Inc.)*. Available in straight and extension models up to 28 ft. in length. So light. So durable. No sag. Non-slip rungs. **(299)**

Handsome is the word for copper-finish dispenser *Mac's Super Gloss Co.* tosses in with three 5-lb. cans of waterless hand cleaner. **(300)**

Your plant grounds will be even more attractive if lawns, flower beds, driveways, etc., are edged with steel curbing *(Joseph T. Ryerson & Son, Inc.)*. Comes in 16-ft. lengths, painted green, with seven 18-in. stakes. Costs less to install than concrete curbs. Re-locate it any time you like. **(301)**

Ultrasonic soldering iron *(Gulton Industries)* is designed to solder —without flux—materials like aluminum and magnesium. For any other uses where it is necessary to avoid the corrosive effect of flux. **(302)**

Don't shout. They can't hear you—unless you're using that new transistor-powered megaphone *(Motorola, Inc.)*. Has a range up to ¾ miles. **(303)**

Men who handle abrasive materials ought to be wearing Koroseal-coated canvas gloves *(B. F. Goodrich Industrial Products Co.)*. Comfortable because they're cut generously and have a shell of knitted jersey. Also protect wearer against acids, caustics, petroleum, mineral oils. **(304)**

Out, damp spot! said the PE as he opened a can of Hum-I-Dri *(Speco, Inc.)*—with apology, naturally, to Lady Macbeth. This chemical absorbent is said to remove as much as 12 times its weight in moisture from the air. **(305)**

The photo-copier in our office is worth its weight in gold. That's why we hasten to tell you about the Verifax Bantam *(Eastman Kodak Co.)*. Weighs only 14 lb., can handle 8½x11 letters, drawings, etc. For about 2½¢ a copy. **(306)**

If it's enclosed-type benches you're looking for, we suggest a new line *(Lyon Metal Products, Inc.)*. All-steel. Adjustable shelves. Sliding doors to provide locked storage. Heavy-door top (or laminated hardwood, if you like). **(307)**

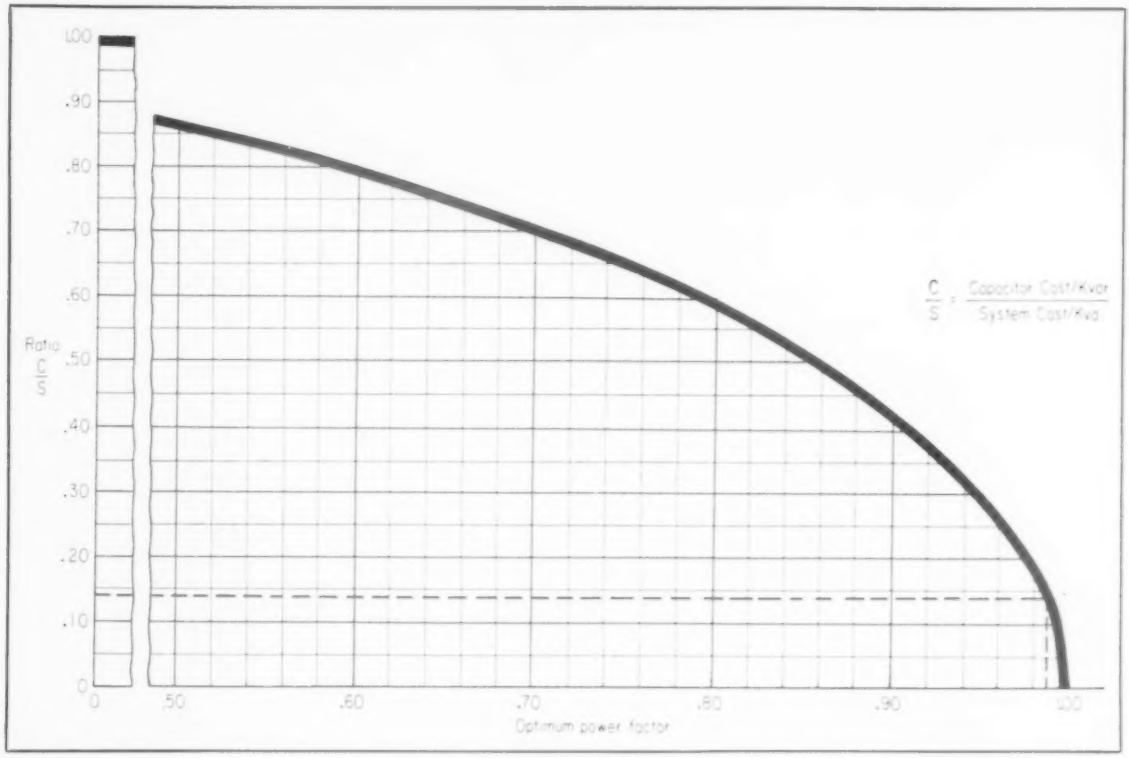
That automatic door your plant has been needing merely awaits the installation of a new operator *(Electronics Corp. of America)* not much larger than an ordinary door check. Mat switch or photoelectric control. **(308)**

The nearer the cleaning station, the oftener the worker will clean his goggles. Safety directors are sure to like a low-cost cabinet *(Mine Safety Appliances Co.)* that's only 7½x5x5 and can be easily mounted on wall or machine. Holds a 4-oz. bottle of Fogpruf and 200 tissues. **(309)**

Then there's Skyscraper, a king-size (28 in. high) goggle cleaning station *(The Wilkins Co.)* that holds a 16-oz. bottle of lens cleaner and seven packs (1400 sheets) of no-lint tissues. Advantage: less refilling. **(310)**

More Ideas of the Month in Press Time Report following page 80

WITH OPTIMUM PF FROM THIS CURVE YOU CAN . . .



Saving Big on Power Investment

This fresh slant on power factor correction will show you how to carve up to 30% off your investment in that new (or redesigned) electrical system.

FIGURE ON a bonus saving, often overlooked, when you're counting the gains that will follow power factor (PF) correction in your plant. Why? Because PF correction is more than a cure for those heavy inductive loads you're adding to your electrical system these days—motors, welders, fluorescent lights, and the like. And it can do a good deal more than just save money on your power bills.

Bonus saving?—A reduction in the size—and therefore the cost—of your electrical equipment.

How big a saving? If you make your PF studies while designing your system or planning changes, and if they show PF correction is feasible, you can save from 20 to 30% on equipment cost—and still wind up with a flexible system.

Easy figures—These days, it's not hard to make a PF study. Load-center substations, now almost universally used, greatly reduce the number of variables that formerly made such calculations complex. Result: You can make a quick, rough estimate (graph above, table on facing page) that will tell you whether PF correction will cut your equipment ratings—and costs. To see how to do this, read on.

MAKING YOUR PF STUDY

To keep things simple, let's base our estimates on the use of capacitors to correct PF. Generally, they're the cheapest approach, though in certain types of plants it might cost

By G. W. WALSH, Application Engineer, Engineering Planning & Development (Schenectady), and G. R. MENKART, Specialist, Capacitor Department (Hudson Falls, N. Y.), General Electric Company.

. . . FIGURE A PF CORRECTION THAT WILL PAY OFF

POWER FACTOR CORRECTION TABLE

Original Power Factor In Per Cent	Desired Power Factor In Per Cent																				
	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
50	.982	1.008	1.034	1.060	1.086	1.112	1.139	1.165	1.192	1.220	1.248	1.276	1.303	1.337	1.369	1.403	1.441	1.481	1.529	1.590	1.732
51	.936	.962	.988	1.014	1.040	1.066	1.093	1.119	1.146	1.174	1.202	1.230	1.257	1.291	1.323	1.357	1.395	1.435	1.483	1.544	1.686
52	.894	.920	.946	.972	.998	1.024	1.051	1.077	1.104	1.132	1.160	1.188	1.215	1.249	1.281	1.315	1.353	1.393	1.441	1.502	1.644
53	.850	.876	.902	.928	.954	.980	1.007	1.033	1.060	1.088	1.116	1.144	1.171	1.205	1.237	1.271	1.309	1.349	1.397	1.458	1.600
54	.809	.835	.861	.887	.913	.939	.966	.992	1.019	1.047	1.075	1.103	1.130	1.164	1.196	1.230	1.268	1.308	1.356	1.417	1.559
55	.769	.795	.821	.847	.873	.899	.926	.952	.979	1.007	1.035	1.063	1.090	1.124	1.156	1.190	1.228	1.268	1.316	1.377	1.519
56	.730	.756	.782	.808	.834	.860	.887	.913	.940	.968	.996	1.024	1.051	1.085	1.117	1.151	1.189	1.229	1.277	1.338	1.480
57	.692	.718	.744	.770	.796	.822	.849	.875	.902	.930	.958	.986	1.013	1.047	1.079	1.113	1.151	1.191	1.239	1.300	1.442
58	.655	.681	.707	.733	.759	.785	.812	.838	.865	.893	.921	.949	.976	1.010	1.042	1.076	1.114	1.154	1.202	1.263	1.405
59	.618	.644	.670	.696	.722	.748	.775	.801	.828	.856	.884	.912	.939	.973	1.005	1.039	1.077	1.117	1.165	1.226	1.368
60	.584	.610	.636	.662	.688	.714	.741	.767	.794	.822	.850	.878	.905	.939	.971	1.005	1.043	1.083	1.311	1.192	1.334
61	.549	.575	.601	.627	.653	.679	.706	.732	.759	.787	.815	.843	.870	.904	.936	.970	1.008	1.048	1.096	1.157	1.299
62	.515	.541	.567	.593	.619	.645	.672	.698	.725	.753	.781	.809	.836	.870	.902	.936	.974	1.014	1.062	1.123	1.265
63	.483	.509	.535	.561	.587	.613	.640	.666	.693	.721	.749	.777	.804	.838	.870	.904	.942	.982	1.030	1.091	1.233
64	.450	.476	.502	.528	.554	.580	.607	.633	.660	.688	.716	.744	.771	.805	.837	.871	.909	.949	.997	1.058	1.200
65	.419	.445	.471	.497	.523	.549	.576	.602	.629	.657	.685	.713	.740	.774	.806	.840	.878	.918	.966	1.027	1.169
66	.388	.414	.440	.466	.492	.518	.545	.571	.598	.626	.654	.682	.709	.743	.775	.809	.847	.887	.935	.996	1.138
67	.358	.384	.410	.436	.462	.488	.515	.541	.568	.596	.624	.652	.679	.713	.745	.779	.817	.857	.905	.966	1.108
68	.329	.355	.381	.407	.433	.459	.486	.512	.539	.567	.595	.623	.650	.684	.716	.750	.788	.828	.876	.937	1.079
69	.299	.325	.351	.377	.403	.429	.456	.482	.509	.537	.565	.593	.620	.654	.686	.720	.758	.798	.840	.907	1.049
70	.270	.296	.322	.348	.374	.400	.427	.453	.480	.508	.536	.564	.591	.625	.657	.691	.729	.769	.811	.878	1.020
71	.242	.268	.294	.320	.346	.372	.399	.425	.452	.480	.508	.536	.563	.597	.629	.663	.700	.741	.783	.850	.992
72	.213	.239	.265	.291	.317	.343	.370	.396	.423	.451	.479	.507	.534	.568	.600	.634	.672	.712	.754	.821	.963
73	.186	.212	.238	.264	.290	.316	.343	.369	.396	.424	.452	.480	.507	.541	.573	.607	.645	.685	.727	.794	.936
74	.159	.185	.211	.237	.263	.289	.316	.342	.369	.397	.425	.453	.480	.514	.546	.580	.618	.658	.700	.767	.909
75	.132	.158	.184	.210	.236	.262	.289	.315	.342	.370	.398	.426	.453	.487	.519	.553	.591	.631	.673	.740	.882
76	.105	.131	.157	.183	.209	.235	.262	.288	.315	.343	.371	.399	.426	.460	.492	.526	.564	.604	.652	.713	.855
77	.079	.105	.131	.157	.183	.209	.236	.262	.289	.317	.345	.373	.400	.434	.466	.500	.538	.578	.620	.687	.829
78	.053	.079	.105	.131	.157	.183	.210	.236	.263	.291	.319	.347	.374	.408	.440	.474	.512	.552	.594	.661	.803
79	.026	.052	.078	.104	.130	.156	.183	.209	.236	.264	.292	.320	.347	.381	.413	.447	.485	.525	.567	.634	.776
80	.000	.026	.052	.078	.104	.130	.157	.183	.210	.238	.266	.294	.321	.355	.387	.421	.459	.499	.541	.608	.750
81	.....	.000	.026	.052	.078	.104	.131	.157	.184	.212	.240	.268	.295	.329	.361	.395	.433	.473	.515	.582	.724
82	.....	.....	.000	.026	.052	.078	.105	.131	.158	.186	.214	.242	.269	.303	.335	.369	.407	.447	.489	.556	.698
83	.....	.....	.....	.000	.026	.052	.079	.105	.132	.160	.188	.216	.243	.277	.309	.343	.381	.421	.463	.530	.672
84	.....	.....	.....	.....	.000	.026	.053	.079	.106	.134	.162	.190	.217	.251	.283	.317	.355	.395	.437	.504	.646
85	.....	.....	.....	.....	.....	.000	.027	.053	.080	.108	.136	.164	.191	.225	.257	.291	.329	.369	.417	.478	.620
86	.....	.....	.....	.....	.....	.....	.000	.026	.053	.081	.109	.137	.167	.198	.230	.265	.301	.342	.390	.451	.593
87	.....	.....	.....	.....	.....	.....	.....	.000	.027	.055	.083	.111	.141	.172	.204	.239	.275	.316	.364	.425	.567
88	.....	.....	.....	.....	.....	.....	.....	.....	.000	.028	.056	.083	.113	.144	.176	.211	.247	.288	.336	.397	.540
89	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000	.028	.055	.086	.117	.149	.183	.221	.262	.309	.370	.512
90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000	.028	.058	.089	.121	.155	.193	.234	.281	.342	.484
91	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000	.030	.061	.093	.127	.165	.206	.253	.314	.456
92	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000	.031	.063	.097	.135	.176	.223	.264	.426
93	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000	.032	.066	.104	.145	.192	.253	.395
94	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000	.035	.072	.113	.160	.221	.363
95	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000	.036	.078	.125	.186	.328
96	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000	.041	.089	.150	.292
97	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000	.048	.109	.251
98	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000	.061	.203
99	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000	.142
100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.000

Begins on page 102

"...Power factor correction will pay off

less to use one or more over-excited synchronous motors.

When an a-c system load is inductive, the plant system (utility system, too) must supply kilovars as well as kilowatts. But when kilovars must be transported over the distribution system, some of the system capacity is tied up carrying this "non-profit" part of the load. On the other hand, kilovars furnished by capacitors at the load need no distribution-system capacity — and thus release equipment capacity for productive kilowatts.

Before you can find out whether PF correction will cut equipment costs, you must know approximate cost of the complete system without PF correction. And you must know the cost of the next smaller rating system—assuming PF correction can make it possible.

Capacitors cost about $10 per kilovar of capacity. So PF correction will pay off only if it costs less than the saving it provides. This relationship is expressed in the following formula (C = cost of PF correction per kilovar, S = system cost per kilovar):

$$\text{Optimum PF} = \sqrt{1 - \left(\frac{C}{S}\right)^2}$$

The curve (p. 102) shows the relationships derived from this formula. With this curve, plus the PF Correction Table (p. 103) and equipment cost data, it will be easy to estimate two things: (1) how much PF correction will save you on equipment cost and (2) what level of PF correction will be most economical for you. To see how the calculations are done, take three cases—all based on a simple load-center system that gets more complex as we go from Cases 1 to 3.

CASE 1—SMALL LOAD

System will be installed in a small plant, served by the local utility at 4160 volts. Interlocked armored cable (700 feet) will feed a conventional indoor load-center substation with fused primary switch. Power will be distributed at 480 volts over bus duct to six 200-ft., 480-volt feeders with large low-voltage air circuit breakers.

Initial load will be 9000 kva. at 70% PF. Maximum of 1300 kva. at 70% PF will be reached in five years. Calculation shows that maximum future load will still be less than 1000 kilowatts (0.70 x 1300 kv. = 910 kw.). This way, either a 1500 kva. or a 1000-kva. substation could be used, depending on whether you install PF correction.

Now figure the costs of the two substations without capacitors:

1000-kva. substation	
Primary cable (700 feet, 2/0)	$ 2,800
Low-voltage cable (1200 feet, 250 mcm.)	6,600
Substation	$30,000
Total	$39,400

1500-kva. substation	
Primary cable (700 feet, 250 mcm.)	$ 5,200
Low-voltage cable (1200 feet, 350 mcm.)	7,800
Substation	47,000
Total	$60,000

Gross saving in favor of the smaller system is $20,600.

Now see what happens to cost when you add capacitors to the smaller system. To use the smaller system and make the $20,600 saving possible you'll need 300 kilovars of capacitors. This gives you an S factor ($20,000 ÷ 300) of about $69. Your C factor (cost of capacitors per kilovar) is about $10. Ratio C ÷ S is 0.145. Take this ratio into the graph (p. 102), and you'll find optimum PF would be 99%. This big a difference between actual and optimum PF is pretty good evidence you can save on investment by applying capacitors at the load.

With an eye on investment (not on ideal PF), you'll find you need a load PF of only 91% (910 kw. ÷ 1000 kva.) to stay within the 1000-kva. substation rating. Now go to the PF Correction Table (p. 103). Come down the column for desired PF (91%) to the line for original PF (70%). Multiply the figure you find (.564) by 910 kw. (maximum future load), and you'll get 513 kvar. That's how much correction you'll need for 91% PF. Subtract cost of 513 kvar. of correction ($10 per kvar.) from your $20,600 saving, and you get a net saving of about $15,500—if you buy the smaller system and use capacitors.

Three points stand out here:

. . . *The jump* in size from one equipment rating to the next is often very large. With a few kilovars of PF correction you may be able to use much smaller equipment.

. . . *You'll gain nothing*, from an investment standpoint, by adding PF correction beyond what will make the smallest investment possible.

. . . *A load kilowatt check* won't show all the savings possible with PF correction (e.g., lower installation costs, space savings, deferred investment expenses, lower auxiliary equipment costs). But it will show how much you can reduce transformer size. In turn, transformer rating, a key factor in short-circuit levels, affects the cost of switchgear and cable.

CASE 2—SMALL, GROWING

Assume same basic system as in Case 1. But figure the load will climb to 1500 kva. at 70% PF. Even at 100% PF you couldn't use a 1000-kva. substation because the load would be greater than 1000 kilowatts. Cost of secondary cables would be same as in Case 1. Only costly system component with potential savings: primary cable.

To find out quickly whether this is worth looking into, go back to the PF Correction Table (p. 103). To raise a 1050-kw. load (.70 x 1500 kva.) from 70% PF to 100% would call for 1071 kvar. (1.020 x 1050), or $10,710. No chance of saving anything near this figure just by smaller cable sizes on a 700-ft. run. Capacitors would cut cost little or none at all. Besides, with the S factor (system cost per kilovar) smaller than the C factor (cost of PF correction per kilovar), the resulting PF is imaginary and there's no economy to be gained.

CASE 3—COMPLEX SYSTEM

Assume a fairly complex system. Utility power at 69 kv. comes to a master unit substation, from which it's distributed on bus duct and over 700 feet of cable, at 4160 volts, to

if it costs less than the saving it provides"

two load-center substations (4160/480 volts) and to two large motor loads. Each of the two load-center substations carries a load identical to that in Case 1. The large motor load totals 2000 kva. at 90% PF. Without any PF correction the cost of the system would include two 1500-kva. load-center subs, one 5000-kva. master sub, and cable.

First take the master substation. Without PF correction, total load it must serve includes the 480-volt motor load (2600 kva. at 70% PF—1820 kw. and 1950 kvar.) and the 4160-volt motor load (2000 kva. at 90% PF—1800 kw. and 870 kvar.). Total is 3620 kw. and 2720 kvar., or 4550 kva. at 80% PF. Load in excess of the next lower standard substation rating (3750 kva.) is 800 kva. Corrected PF needed to handle this load with a 3750-kva. substation is 97% (3620 ÷ 3750). Gross difference in cost between the 3750- and 5000-kva. substations is $7000 ($114,000 – $107,000).

Now for load-center substations. Calculation is the same as for Case 1, which indicated a gross saving of $20,600 per substation. For two subs, the gross saving is $41,200.

As for cable, size reduction (1400 feet of 2/0 cable instead of 250 mcm. cable) because of lower short-circuit requirements in the 3750-kva. substation (instead of 5000 kva.) would be $4800 ($10,400 *vs.* $5600).

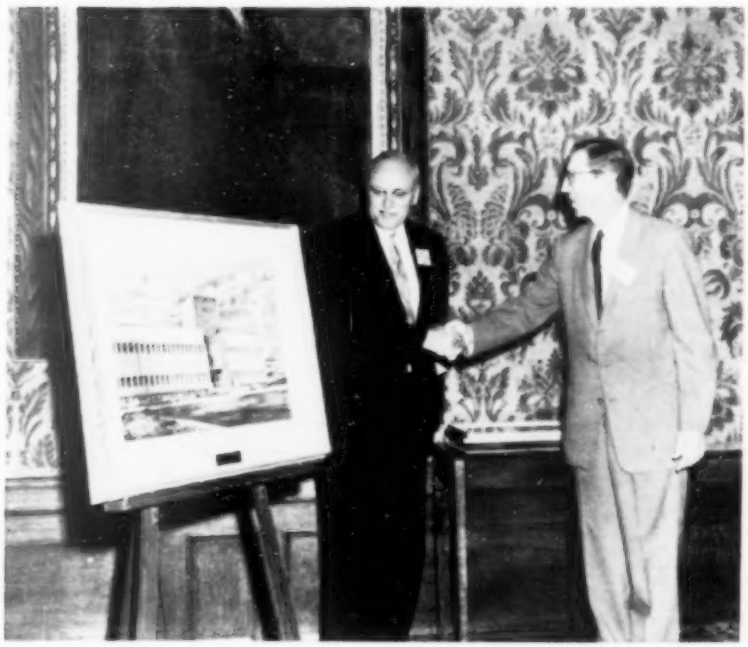
Add it all up: $7000 on the master substation, $41,200 on the load-center substations, and $4800 on cable. Total gross savings: $53,000. Next, find your optimum PF. System cost reduction per kva. is $66.30 ($53,000 ÷ 800 kva.) C ÷ S factor therefore is .151 ($10 ÷ $66.30). Take this factor into the graph, and you'll get 98.5% PF.

Now see whether PF correction is feasible economically. To use a 3750-kva. master substation you'll have to correct PF to at least 97%. The small difference between this and optimum PF (98.5%) indicates there's no further use in trying to cut equipment savings by improving PF beyond this 97%. The PF Correction Table shows that raising PF from 80% original to 97% desired will require 1810 kvar. (.499 from the table multiplied by 3620 kw. total system load). At $10 per kvar., correction will cost $18,100. Net saving therefore will be $34,900 ($53,000 gross savings minus $18,100 for cost of PF correction).

Capacitors are usually installed as close as practicable to the load. Here the kilovars required to improve motor PF will be switched with the motors. Remainder of the 1810 kilovars will be connected at the two load-center substations.

FLEXIBLE STILL

You needn't be afraid lower rated equipment will give you an inflexible system, incapable of expansion. Sure, PF correction at first glance seems to cut the margins of capacity available for load growth. But a proper system design includes the best estimates of margins needed for load growth. The design kva. you use for your PF study should include these margins. Remember: True flexibility doesn't come from built-in excess capacity. It comes from design that permits you to add capacity economically as needed.

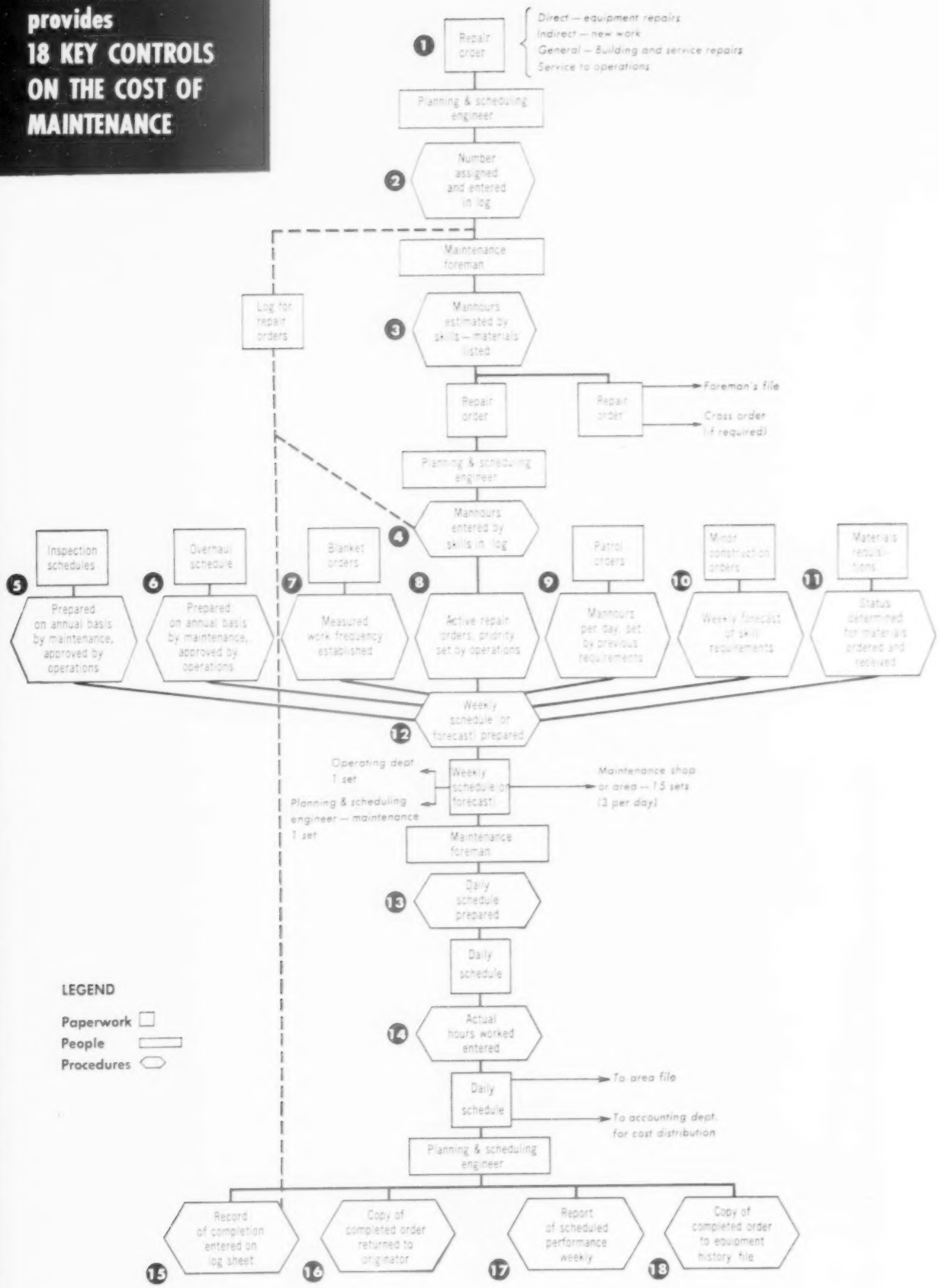


Coming in May: Best Plants of 1958

WANT a good look at the 10 Best Plants of 1958? (Your own new plant—or your neighbor's—could be one of them.) Looking for bright ideas you could use in your own plant of the future?

Then FACTORY for May is for you. It will be our 24th Annual Best Plants Issue. It will bring you pictures (in full color for the first time) of the 10 top plants selected as winners from nearly 1000 manufacturing plants across the nation. Plus, for each of the winners, full description of buildings and grounds, electrical and other plant services, and materials-handling features that set these 10 apart from all others. Plus 20 pages of smart ideas from other plants that qualify for special mention.

How work flow provides 18 KEY CONTROLS ON THE COST OF MAINTENANCE



18 Checks on Maintenance Costs

Today maintenance is big business—and getting bigger. These 18 key controls will help bring costs in your plant (big or small) into line—and keep them there.

"WHAT'S WRONG HERE? Our maintenance costs keep climbing!" This is one of the big problems bothering top management today. Sooner or later you'll have to face up to it—if you haven't already.

What's your answer? Here are some that look convincing:

"Our more complex equipment needs more maintenance." "We must have a good organization and good supervisors to insure efficient maintenance operation." "We've added a preventive maintenance setup that minimizes downtime." "We've adopted a cost system to tell us where every dollar is spent."

But none of these is the right answer, nor satisfying to a cost-probing top management. What management wants to know is: "Did you *have* to spend all those dollars? And did you spend them wisely?"

No amount of high-class organization, skilled supervision, and down-to-the-penny cost systems, of themselves, will guarantee best costs. What you need is a sure way of knowing whether your maintenance operation is meeting requirements effectively. How can you find this out—prove it to top management? Through a program of operational controls that give you a continuing audit of performance on every bit of maintenance work you do.

You'll see such a system of controls in the flowsheet on the facing page. It audits performance at 18 points in work progression. It can bring the following benefits:

. . . *Insure* best execution of maintenance procedures.

. . . *Help* spot the various reasons for poor performance.

. . . *Cut* paperwork, supervision.

. . . *Make* maintenance operations really effective.

. . . *Pinpoint* areas where changes should be made.

. . . *Give* meaningful answers to the tough questions that come from top management.

WHY HAVE CONTROLS?

Aren't good job procedures enough? In a limited sense, yes. They help keep costs in line by indicating the best way to do a job. Yet if two men do the same job the same way, one may take longer than the other. In short, job procedures *aren't* enough. You've got to have controls. Here's the difference between the two. In a job procedure you establish a way of doing work—the planning "how." In a control you exercise a directing influence over the procedures that allows you to verify the results. In other words, it's a means of knowing *how well* your system is operating.

How many controls?—Enough of them, at the right places, so you can trace a poor result to its cause. Enough to cover all work, planned and unplanned, involving every type of skill and work requirement.

For instance, improvements made in an area of one of our plants should have resulted in lower maintenance cost. Instead, cost for the period increased. We didn't know why, because controls weren't adequate. The higher cost resulted from more frequent cleaning of a heat exchanger to improve yield and quality control. The accounting setup did not include a breakdown of "Service to Operations," to which this charge properly belonged. Better work classification would have pinpointed the cost as being outside the control of the maintenance department. And would have shown whether the returns in quantity and quality would justify the extra cost.

What, more paperwork? — Not necessarily. To be sure, the extent to which you need controls will vary with plant size and complexity of operations. On balance, though, one result of good controls may be less paperwork—even less supervisory time.

Just for big plants?—No. You may not need all 18 controls in the flowsheet. But we've found that even with maintenance forces as small as 20 men, there's still a need for well-defined procedures and adequate controls—perhaps even greater need. They're your only way to tell whether your maintenance operation is really effective.

Won't cost figures do the same?—By no means. Remember, they are "after-the-fact" figures. Controls alone will help you spot the needless or ill-advised jobs before the money is spent. That's why they must be continuing—and integrated with the work flow. Otherwise you'll have to rely on periodic dollar reports of work done as your index of performance. Even at best, maintenance dollars aren't a complete measure. They indicate trends only when operating conditions remain constant—which is unusual. And they do not reflect effectiveness because costs for both periods may be 50% higher than they should have been in the first place.

A problem solver?—More than that. A control system will give you feedback information that will re-

lieve you of meeting failures on a "situation" basis. It will spot the areas where change or improvement is needed, thus attack the cause rather than the crisis. Take the case where some of our production machines were always going out of adjustment and affecting quality and quantity. The crisis answer was: Assign men to take care of adjustments. It worked. But it cost a lot more than the real answer, which an engineering analysis of the history and records would have revealed—simply redesign one of the machine components.

Eliminate the human element? Not at all. Controls are not a complete or automatic answer to the problem of reducing maintenance costs. They do provide checkpoints along the line of work flow. But it takes people with good knowledge of operations and technical judgment to make decisions at these points—on necessity of the work, what to do, when to do it, how to do it, who is to do it.

Basically there are two ways to improve maintenance performance: (1) reduce the workload by eliminating unnecessary work, and (2) improve the effectiveness of necessary work. Good controls will guard these objectives by forcing step-by-step decisions along the way.

Too late to start?—Never. In fact, the sooner the better. Especially if your plant has grown. Don't expect to get along without controls just because you didn't need them at the start. Today you need facts on what's going on, how well it's being handled. Controls are your answer.

18 Maintenance Control Points

We've developed a schematic flowsheet for paperwork and procedures (p. 106) that covers most maintenance work in a typical plant. Some plants can get along with fewer controls. Others need more. A plant relying partly on contract maintenance, for example, would want to be able to analyze that operation separately.

Our schematic doesn't attempt to follow the detailed flow or destination of all paperwork. But it does identify three kinds of control points in the flow:

Squares—Basic forms that people must originate during work flow.

Rectangles — Key maintenance positions through which the forms flow.

Diamonds—Procedures followed by people who make or influence all decisions during work flow.

Here's the way the 18-point control system works:

1. WORK CLASSIFICATION

If we classify all work orders so as to separate the variables over which the maintenance organization has no influence on cost, we can accumulate labor and material charges that place the responsibility for cost where it belongs.

Variations in maintenance costs are not always due to increased or decreased equipment repair costs. They are often found in the cost of new work or alterations, rearrangement of equipment, services to operations. Without at least a major breakdown of "direct," "indirect," "general," and "services to operations" as shown at top of chart, we don't know for what type of work the dollars were spent. With such control, we get the true picture.

Usually the maintenance organization has some control over cost of repairs to equipment. It can suggest modifications in design, or replacement of the unit as a means of reducing repair costs. It can initiate action to improve conditions. The same applies—but to a lesser degree—to new work and alterations to improve the operation.

Maintenance has little if any control, however, over services to operations, such as routine or periodic cleaning where repairs are not necessary. As an example, if production wants heat exchangers cleaned every 3 weeks instead of 3 months, the only responsibility of maintenance is to do it at the lowest cost. And lowest cost may not mean lowest maintenance dollar cost. It could mean $200 for a 2-hour job against $100 for a 4-hour job, yet result in an over-all saving of production downtime of 2 hours—possibly worth $300 an hour.

2. LOG SHEET

By keeping a running log of all work orders (see facing page) we can follow every order from the cradle to the grave. Nothing gets lost or overlooked—nothing falls through the cracks. We can quickly calculate our total active backlog of work at any time.

Log sheets can be maintained at a central point, or in the area maintenance offices in larger plants. At this point of control (when a work order has been issued) only the first three items—order number, brief description, and date received—are entered. The form provides other controls—which we'll discuss later.

3. WORK ANALYSIS

This is the first man-hour control in the series. It's a "must" if you're going to avoid constant schedule revisions. It calls for careful estimates of man-hour requirements by skills, plus listing of all materials, tools, and equipment needed for the job. Loose man-hour estimates or a slip-up in material availability can mean postponement and rescheduling.

Work analysis can be done by a job planner, or by a work measurement applicator collaborating with a foreman. Where these staff people do not exist, a foreman, maintenance engineer, or supervisor can handle it. It's the only way to develop a realistic backlog of work by skills and the only way to assure effective work scheduling.

4. WORK BACKLOG

In the remaining columns of the log sheet you then enter the man-hour estimates by skills (from the work analysis) for each work order. This provides backlog control by skills or groups.

MAINTENANCE ORDER LOG

Order Number	Date Rec'd.	Date Comp.	Mat'l. on hand	Shutdown Required	Job Description	Estimated Hours Required: Mat.	Pipe	Weld.	Mach.	Rig	Paint	Carp.	Elect.	Inst.	Labor	Total Est.	Total Act.
~~46125~~	~~11/4~~	~~11/12~~	✓	✓	~~Replace cover gasket F-6~~		8									8	6
~~46126~~	~~11/4~~	~~11/8~~	✓		~~Replace rod P-12~~	4										4	4
46127	11/4		12/2	✓	Renew piping per R-8-4		32	8		4	12					56	
~~46128~~	~~11/5~~	~~11/20~~	~~11/16~~		~~Install gauge per R-872~~	16										16	14
46129	11/5		✓	✓	Repair dryer drive D-4	16							2				
46130	11/5	11/20	✓		Repair flashing per R-875							32					
46161	11/17		✓	—	Replace #12 Fan	8				2						10	
46162	11/17		✓	✓	Install by-pass at R-20		16									16	
46163	11/18		—	✓	Pressure test T-13		8									8	
46164	11/18		✓	✓	Repair dryer dust leaks	16										16	
46165	11/18		✓		Repair Handrail Gr. 8		8	4								12	

Order log Every repair order is entered on this log sheet. This way, jobs are tracked at every step from start to finish, are never lost in the shuffle. And backlogs of repair work are easy to compute.

Don't underestimate the importance of establishing man-hour requirements. We can't develop a sound over-all work plan without this information. By knowing our man-hour needs with reasonable accuracy we minimize the cost penalties of jobs that don't have a pre-set end point. We aren't forced to classify other work as "urgent" or "emergency" because of unanticipated delays in handling planned work. Constant rescheduling does nobody any good. Pulling men away from a job to take care of an "urgent" one is always costly. Pulling them away a second time to an "emergency" job piles up the costs and drops worker morale to a new low. Foremen are hurt, too. Besides wasting their time, they have to change their instructions—another morale killer. Instability of maintenance operations is a vicious cycle of unnecessary tensions and pressures that harms maintenance effectiveness and the attitude of the men involved.

We consider this and the previous three controls as controls over repair work loads that vary month to month. They also provide important data on force requirements.

5. INSPECTION SCHEDULES

To develop an efficient daily work plan or schedule requires two things: (1) a weekly schedule of repair work; (2) a long-range plan for other types of work. Trouble is, there seem to be so many variables and unknown quantities. But if you can develop man-hour controls by analysis of the long-range work, you can reduce their number. You can then confidently assign a high percentage of work on the basis of its being planned and analyzed beforehand. That's the purpose of this control.

Usually a certain amount of plant equipment must be serviced or inspected periodically—for example, steam traps, scales, instruments, and electrical equipment. Our experience has shown that for this type of work we can develop procedures, measure the workload, and establish frequency. Thus we can set up a master schedule to show servicing or inspection dates for a year or more. From this schedule we know the man-hour requirements for any particular week for every skill.

We now have good estimates of skill hours required for inspections on a weekly basis. We get away from the loose "blank-check" method of instructing mechanics to "go out and take a look," with no idea how long it will take or what tools they will need. Instead, we can tell them what to inspect, measure the time required, and establish frequencies based on equipment repair history (adjusted as conditions indicate). And then we can tell how effective our work has been by comparing estimated time with actual time on a weekly or monthly basis. This serves as an important man-hour control.

6. OVERHAUL SCHEDULE

The same principle of separating the fixed from the variable type of work applies here. Some overhauls are jobs you may do only once in a blue moon, but still they are repetitive and important. Many others are the more complex, multi-skill jobs. Yet it's possible to develop estimated or measured job procedures on both types that include all the essential information: shutdown time required, job schedule by skills, complete listing of tools, materials, and equipment required, and complete job plans.

We can develop all these data while a job is being performed, jointly by a foreman and analyst or maintenance engineer. Thus we can build up a reference file on all major overhauls and repairs as the work occurs. The foreman doesn't have to take a stab at estimating job requirements each time the job comes through—it's been done. Reliable estimates through detailed job plans also help develop sound weekly work schedules.

In one case we developed a five-page procedure of tools, materials, and equipment for replacing a ram in a hydraulic system accumulator. This job was important enough to be pre-studied because it required complete plant shutdown. Result: Downtime was held to 7 hours, or about 70% of the time originally estimated before the job plan was developed. And the procedure stood

MAINTENANCE COSTS . . . *Begins on page* 106

Period 12-16-57 through 12-20-57
Daily Schedule Monday Sheet 1 of 1
Supv. E. K. Jones Skill Area Mech.

Man-Hrs. Available 320
Patrol, Sched. Routine & Insp. 120
On Vacation 40
Sub-total 160
Available for Schedule 160
Scheduled 160

Order Price	Description	Order Number	Code	Total Hours Estimated	D.C. Hammond 8811	J.E. Linton 7061	C.P. Kolt 4024	L.G. Humphrey 7842	M.C. Holden 3418	T.L. Walker 8402	L.J. Hoger 6322	J.W. Smith 8332				Hours to Complete
1	Patrol Order Work (Estimated)	-	-	40	8 8											32
2	Scheduled Routine Work	B-40	-	60				8 8								52
3	Scheduled Inspections	B-21	9304	20		4 4										—
4	" "	B-46	9204	30			8 8									22
5	Seal for Rec. Tank 40 lid	46551	9004	4		(4)										4
6	Replace #2 filter screen	45115	9304	32					8 8	8 8						16
7	Repair guard #14 pump	46204	9204	8								8 8				—
8	Repair insul. D.P. trans line	46184	9204	12												
9	Replace #22 fan	46192	9204	10												
19	Repair leaks, seal water sys.	46205	9304	4												
20	Replace seal P-9 pump	46211	9304			4 4										
	Hours Forward															
	Total Hours Worked				8	8	8	8	8	8	V	8				

Weekly schedule Effect of this carefully drawn schedule, focal point of seven preceding controls, is a weekly "contract" with foremen—not a catch-as-catch-can start every day of the week.

—with only one minor change—the second time the equipment was down for a similar replacement.

7. BLANKET ORDERS

This term may need definition. Some plants use blanket or standing orders to accumulate costs of a functional character, such as lamp replacement or lubrication—in other cases, as a simple means of covering approval for minor work. Use of blanket or standing orders has to be carefully considered. Our philosophy is: If you don't know or can't measure the content of a blanket order, you don't have control of the work. You end up with a batch of catch-all accounts.

A blanket order shouldn't be open-ended. For example, in lubrication we don't have to issue a blank check. We can establish frequencies. We can develop procedures. We can establish the most effective routes. We can estimate (or measure) the time a mechanic needs to perform scheduled work. Thus we can arrange reasonably tight schedules. This allows better over-all work scheduling and man-hour control by the simple comparison of actual with estimated time for any period.

There's more to this story. Often individual orders are mistakenly issued to provide control when a blanket order could be as effective. In one case, for example, a plant was issuing separate orders for individual weighing scale inspections—some on a daily basis, some on a weekly basis. It did this because it wanted adequate control and wanted an accurate distribution of maintenance charges to 10 production accounts. A switch to a blanket order gave all the necessary information in one account instead of 10. And it cut the foreman's time and clerical cost. Costs were apportioned on a "number of units" basis.

Of course any job (major or minor), aside from routine procedures, requires a separate order to retain control. While this means more paperwork, it's the only way to get details necessary for good control. Note the Controls 5, 6, and 7 are only for the fixed routine or established types of workload.

When is it best to perform repairs, inspections, or overhaul work on a scheduled basis or as indicated by conditions (Controls 5, 6 and 7)? You can find out through analysis of equipment history. When the analysis indicates that inspections, adjustments, replacements, or overhauls can and should be on a regular schedule, then make it part of the routine or established workload. The bigger this share of the total workload, the more effectively you can operate.

8. OPERATING APPROVAL

This is a critical step in repair-work scheduling. If omitted, it can upset nicely drawn work schedules. To this point work orders have been estimated or measured. They are now ready for scheduling. To control or minimize schedule changes, always get production supervision to agree on work priority. Then plan according to priority and get agreement on the schedule itself.

One effective way of doing this is by a weekly meeting of production and maintenance personnel to set up the schedule. Inform production of the time requirements and discuss the date of shutdown. Let production call the shots where dates are flexible. The more jobs scheduled through joint conference, the fewer interruptions there will be for "urgent" or "emergency" jobs.

Some plants have production superintendents initial schedules, approve all "urgent" changes. When agreement has been reached on the weekly schedule, production people can be sure it will be met unless they inject "urgent" requests.

9. MINOR WORK ORDERS

At Du Pont these are frequently called "patrol" orders or "minor" work orders. They cover only minor repairs requiring less than either two or four hours (depending on local policy) and a limited cost of material. Because of the limited scope they require only limited approval—or no approval above first-line supervision. They are generally issued on a daily basis, usually require prompt attention.

Because minor work orders originate this way, there's no means of determining their man-hour requirements in advance. So it's necessary to allow time by skills (based on experience) when setting up daily schedules. Why should we be concerned about control of such small jobs? There's a good reason: Minor repair work can represent a high percentage of the total maintenance workload. Yet it's an area that receives little attention. In some instances we found that over 35% of the maintenance work performed was in the minor work category. But after we established procedures for recurring items as suggested under Controls 5 and 7, the volume dropped to 10-15%. Some of the 20-25% difference was due to a study of this work and transfer to the repetitious or routine work category that permits closer control. Some was due to elimination of the work through improvements or to reduction of the frequency of minor jobs. It's a fertile field.

10. MINOR CONSTRUCTION

In most plants this is a definite part of maintenance operations. Sometimes it's handled by a separate group in the works engineering department, with cross orders for supplementary field or shop work. In any event, we consider that it must be treated like other maintenance work. In short, man-hour controls can be applied here, too, by pre-analysis of labor requirements for the various skills needed in basic construction and supplementary maintenance crew labor.

A good time to make the analysis is during the preparation of the original estimate. Then the supervisor or foreman will have at hand all the necessary man-hour data for scheduling purposes. And here's one advantage in keeping this item as a separate control: It can be a means of balancing the variable backlog of repair work orders that may have to be given priority.

11. MATERIALS

Manpower, of course, is only one part of a maintenance or construction job. Materials are the other part. If we could have an unlimited supply of materials, parts, and spare equipment in the plant we wouldn't need to consider materials control. Obviously, such a supply is unrealistic and would be uneconomical even if it did make life simpler.

Materials control has two main aspects: (1) proper stores in the plant, (2) reliable supply sources. Proper balance of stores inventory can mean big savings in working capital and minimized losses from obsolescence. Against these must be balanced the hazards of downtime when parts are not available. Critical or hard-to-get parts often can justify their cost on the shelf. The decision of what to stock is often a responsibility of maintenance organization. Its physical control is a function of accounting.

The technique of good materials control is a subject in itself. We will consider now only its effect on the stability of work schedules. It's important to have proper coordination of ordering, purchasing, receiving, and inspection functions to ensure that the proper material is on hand when it's needed. It's equally important to know if and when materials are not available, so you can arrange schedules to match delivery dates and avoid changes in manpower commitments.

12. WEEKLY SCHEDULE

All previous 11 controls converge to this one point. A weekly schedule involves an integration of all seven types of work organized under Controls 5 to 11 inclusive. It calls for slotting these elements for any given week into a total workload for that week. Obviously it is the most important point in the whole system. So important that the effectiveness of the weekly schedule or forecast depends entirely on the success with which the seven components have been handled. And let it be repeated, *not less than these seven.* Our experience has taught us that insufficient consideration of any one of these controls can upset the accomplishment of the scheduled work. We can't be too emphatic on this point.

Sample of a weekly schedule used in some Du Pont plants is shown on the facing page. Work orders to be completed during the week are listed in left column. Note that patrol orders (Control 9), scheduled routine work (Control 7), and scheduled inspections (Control 5) are entered in lump-sum figures taken from each of those long-range schedules. We run off enough copies (usually 15) on a duplicator when the schedule has been readied to provide an adequate supply from which foremen can mark up daily schedule sheets for the entire week. What this amounts to is that we have worked out a "weekly contract" with foremen rather than a daily plan.

13. DAILY SCHEDULE

This can be developed merely by indicating on a copy of the weekly work schedule the jobs to be done on a specific day and the assignment of men. Assignments are shown by

"eliminate or reduce the amount of work"

entering the estimated hours above the diagonal line for every man for each specific job.

This control, the previous (No. 12), and following (No. 14), are all work-scheduling controls. Control 12 develops a weekly work schedule. Control 13 narrows it down to a daily basis. Control 14 shows how effectively the schedule has been executed.

14. PERFORMANCE ANALYSIS

At the end of each day the hours worked on each job are entered on the daily schedule below the diagonal lines. Now we have an important man-hour control in the comparison of estimated and actual hours above and below the diagonal lines. We can evaluate our performance of the scheduled work by individual jobs.

In addition, there are other benefits or guides to improvements. Wide variations between actual and estimated hours may mean our estimates or procedures need attention. Or that there wasn't enough supervision on the jobs.

By means of the record of unscheduled jobs classified as "urgent" or "emergency" (which have to be written rather than typed on the schedule sheets), we can investigate and find out whether there were valid reasons for them. This can be a means of reducing future schedule changes.

From this last analysis we can determine whether there has been a condition that the maintenance or operating group did not consider or whether it is really an emergency job or an oversight. A continuing study might show that an unusually high percentage of emergency orders originates in a particular operating area or with individuals in the area. Perhaps someone has not properly anticipated the job or didn't recognize the need in time. With these facts available, we can discuss troublesome points and correct unsatisfactory conditions.

Just a word about the copy of the completed daily schedule that is routed (see flowsheet) to the accounting department for cost distribution. This copy—the last of the "three-per-day" sets— shows actual, not estimated hours. Carbon is omitted the first time the estimated hours are filled in. Also, all patrol orders are stapled to this copy to account for the number of hours scheduled. This serves as a time distribution report of minor work as well. The copy of the patrol order eventually becomes part of the equipment history file.

15. COMPLETED LOG

When a repair work order is completed, the date is marked on the log sheet. Also the entries of estimated hours by skills are cancelled by running a horizontal line through them, thus closing out the order (see log sheet, p. 109).

This continuing daily adjustment provides a record of active orders, each broken down by skills. Thus it affords an up-to-date backlog of repair work, by skills, that can be summarized weekly or monthly to gage force requirements. It's a cinch to draw up a periodic backlog report from this record.

16. COMPLETED ORDER

By return of completed order to him, the originator is able to clear his files. This is especially helpful in limiting discussions to active orders at the weekly scheduling meetings. The foreman's copy of the completed work order can show both estimated and actual time which will serve as an adequate record without getting involved in detailed cost accounting.

17. PERFORMANCE REPORT

This report is prepared weekly to show scheduling effectiveness. The report tips us off in showing what percentage of work done was unscheduled. It can disclose reasons and responsibility.

Why a weekly report? It doesn't let the facts get cold. And the more frequent analysis stimulates interest in improving performance.

These last three controls (Nos. 15, 16, 17) are essentially after-the-fact controls. They bring about a clearing action: Adjustment of work backlog, updating of active work orders, and a report of scheduling performance.

18. EQUIPMENT HISTORY

One method often used for development of equipment history is to set up history and cost cards for major equipment and services. This entails continual posting (by hand or machine) for each work order of the job description, labor and material required, and costs. This method provides you with a permanent record that requires only a review of individual cards for analysis of maintenance of units.

There's another method that requires considerably less clerical work, allows at least as good if not better analysis. It utilizes a permanent file of folders, arranged by equipment piece number or description of the unit, in which copies of completed repair orders and minor orders are filed. In this system an equipment history card is included in the folder, but only for entries of changes in design or specifications and for periodic summaries of history analysis that should be part of the permanent equipment history. But note this: the only details in either method are those that appear originally on the completed work order. Thus the first type of record can't possibly show any more information on the summary card than the second. In fact, it's usually an extract of the work order or a telegraphic condensation. Hence it doesn't show as much.

The equipment history file is an after-the-fact control. It's the source of information we need to arrive at important conclusions about the necessity for the work, the cost and other effects. Also, whether improvements can be made economically to eliminate or reduce the amount of work required.

FACTORY
MANAGEMENT AND MAINTENANCE

PLANT OPERATING MANAGEMENT

CASE BOOK

WARREN J. KING: EDITOR

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Photo Album Records Progress

Keeping tabs on plant progress is easy at Wolverine Tube. A yearly picture album does the job. Does it with a minimum expenditure of time and money.

Photos come from two sources. They're either taken at the plant manager's request. Or they're copies of plant pictures taken for other purposes—such as publicity, advertising, or promotion. The plant manager has the most appropriate pictures mounted in a regular loose-leaf album. Each is identified by a short caption.

Sounds simple? Well, it is! And effective in more ways than one:

. . . *New equipment.* Pictures record installation of new equipment and machines. Help explain to visiting management people and other visitors how new units work.

. . . *New products.* Pictures record the birth of any new product or process for future reference.

. . . *Programs.* Whenever special programs are initiated (such as Wolverine's skill training program) the proceedings are photographed.

. . . *Promotions.* All organization promotions are recorded.

. . . *Methods work.* All pictures that show cost-cutting methods changes are sent to the plant manager by industrial engineering.

. . . *Internal house organ.* Plant manager's album is a good source for house organ leads. Conversely, pictures taken specifically for the house organ are often welcome additions to the album.

. . . *Advertising and publicity.* Picture album is a good source for advertising and publicity pictures. Particularly for historical or flash-back presentations.

. . . *Plant visitors.* The picture album helps management brief visitors on specific plant operations. This lets visitors grasp what they see more quickly.

Source: Vincent A. Zatell, Plant Manager (Detroit), Wolverine Tube, Div. of Calumet & Hecla.

Helicopter Speeds Roof Installations

(Cover Story)

Using a single helicopter to spot more than 100 tons of heating and ventilating equipment on the 13-acre roof of its new Atlas Missile plant saved Convair Division of General Dynamics Corporation (San Diego) thousands of dollars and many working days. In all, 94 pieces of equipment plus 22 tons of pipe were moved during a single weekend. The airlift operation required 70 quarter-mile flights.

Rotor-Aids, Inc. (Ventura, Calif.)

conducted the airlift. It consisted of picking up equipment and materials stockpiled in a parking lot, carrying it across the grounds of the $40-million factory, and lowering it to the roof. Here a crew of riggers hand-jockeyed the units into the proper position.

Long-Lived Tarps

"Four years' use—and our neoprene-coated nylon tarpaulins are almost as good as new." That's the claim of Peel Brothers, Inc. (Hoisington, Kan.) This concern uses the tarps as protective covers for engine and pumphouse units on well-drilling rigs. Finds engines protected from the burning sun and freezing cold by coated nylon tarps have higher efficiency, cost less.

And coated nylon tarps are lightweight. This means savings where short installation periods and relatively short moves are involved. Also means less bulk and less time to erect shelters in place.

Partitions Came Last

Even after the installations of the hung ceiling and carpeting. That's how they did things at Inland Steel Company's new Chicago office building. Floor areas are "totally useful"—have no columns or other obstructions to break up their 10,000-sq. ft. clear span.

During construction each floor was assembled as a unit. With the acoustical steel ceiling installed and the carpeting laid, Hauserman interior partition sections were stacked strategically on the carpeted floor. Working from one end of the floor to the other, clips were attached to floor and ceiling. Then posts and panels were set up.

Snapping Pictures Down a Hole

Problem was to determine which of two blast furnaces needed relining most. Both were banked, and the presence of gas prevented sending a man down for visual inspection. "But why not a camera?" asked operating men at Colorado Fuel & Iron Corporation (Pueblo).

The idea was good but tricky. It meant getting pictures showing stock-line armor conditions beneath the big bell section inside both furnaces, with the camera being lowered through a hatch in the furnace 100 feet above ground level. And pictures snapped at depths varying from 8 to 40 feet from this spot. This introduced problems. Among them:

. . . *Finding a camera* specially suited for the job.

. . . *Synchronizing* the camera's operating components.

. . . *Building containers* to protect the camera against dust and to support the arrangement as it was lowered into the furnace.

. . . *Pre-setting shutter speed* and lens opening by guesswork.

The camera chosen was an old view-model 4x5 Baca fitted with a lens without built-in synchronization. It was sealed in a strong cardboard box to protect it against dust. Had an opening in front for the lens, another on top for the three-battery flash gun. A wooden box protected both camera and cardboard container as they were fitted through the opening and lowered into the furnace. After examing engineering drawings of the furnaces and making some blind calculations, the photographers decided to set the focus for 15 feet, use an f.11 opening and a shutter speed of 100.

It took just about 2 hours to shoot the first eight pictures. Each time the camera had to be lowered, its swinging motion stopped. Then the picture was taken. Each time the camera came out for reloading and resetting, it had to be unpacked and repacked. By leaning over the hole an observer saw the eight successive flashes go off.

Eight blanks were the result. *Reason:* A voltage drop along the extension cord caused a delay in the synchronization of the operating system. By the time the flash bulb went off, the shutter had already clicked and was shut tight.

A new lens with built-in synchronization plus a 5-battery power booster corrected this. On the second try the pictures were clear and sharp. After repeating the procedure on the second furnace, the decision was obvious.

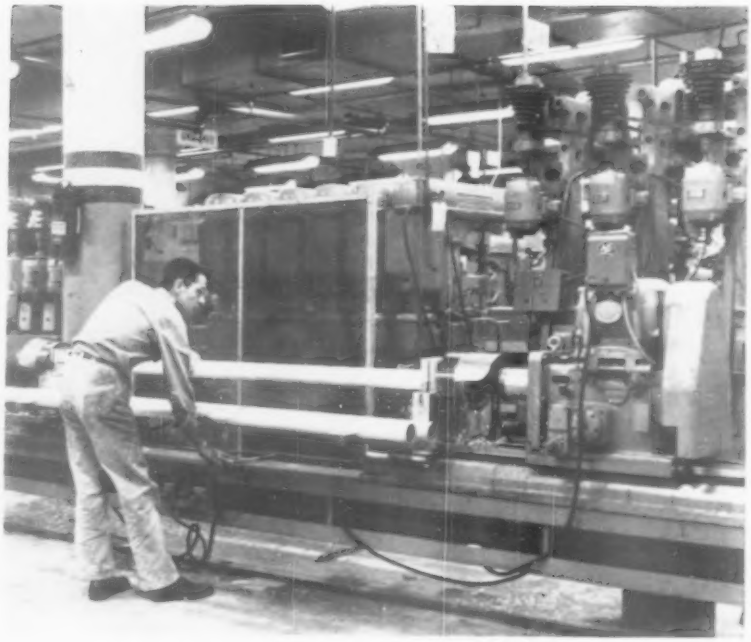
Colorado Fuel & Iron plans to use this technique to probe the inside of furnaces again. Doesn't expect any trouble next time.

Brand-New Way to Raise a Roof

Pumping up a building roof may not be your idea of how to build a grain-storage building. But it's precisely what Cargill, Inc. (Minneapolis), is going to do at its new Fort Worth installation.

Steel will be fabricated flat on the ground, with one side anchored in concrete. Then the roof of the Quonset-like building will be raised by air pressure of 30 pounds per square foot. Once it's in place, the second side will be anchored in concrete. The structure will be rigid enough to withstand winds of more than 100 miles an hour.

Cargill, a processor of farm products, will resort to conventional steel trusses if the air-pressure scheme fails. But if the design—which has been tested on smaller structures—is successful, the roof will go up in a few hours.



BOTH ENDS AT SAME TIME—IN 15 SECONDS

Handling and machining time hit the skids when this machine went into operation at Chance Vought Aircraft, Inc. (Dallas). Developed right in the company's own shop, it machines both ends of a 10-ft. jet fighter rocket tube in 15 seconds. The operator places the part in the air clamp (photo), turns a handle to clamp both ends in place, and then starts the machining cycle for both ends by depressing a single button. A limit switch stops machining and backs heads off when each end is completed. One end is faced and chamfered while other is faced and counterbored.

Big Neoprene Bags Cure Storage Woes

Giant neoprene bags—like the one in the photo—have simplified handling and storage of PVC resin at General Electric Company's Bridgeport (Conn.) wire and cable plant. Powdered resin for thermoplastic cable insulation used to be delivered in 50-lb. paper bags. GE uses a lot of resin. Found itself getting bogged down with storage problems. Especially since all the paper bags had to be stored indoors.

The big 10,000-lb.-capacity collapsible bags solved the storage problem. They're completely impervious to the weather, can be stored outside. But GE production men still had a problem of getting the resin out of the bag and up to its manufacturing department on the second floor of the plant. To do this, they rigged up an air conveyor system. A bag outside the building is positioned for unloading by a fork truck. Then it's connected to the air conveyor system via a valve in its bottom. When manufacturing needs resin, the mixing equipment operator turns a lever and resin begins to flow onto a scale. When the desired number of pounds has been delivered, he turns off the flow.

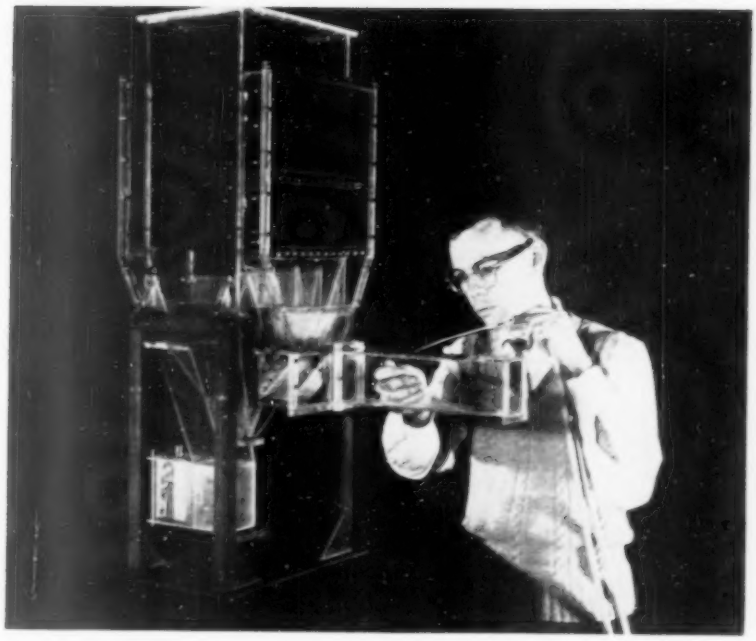
How Roof Ventilation Can Aid Fire Control

Better emergency roof ventilation of industrial plants may be on its way. A formula to aid fire control and minimize damage has evolved from studies at Armour Research Foundation (Chicago), sponsored by General Motors Corporation. In brief, it outlines vent-to-floor area ratios related to particular degrees of fire hazard involved in a plant or certain plant areas. A similar ratio involving draft curtains over various-size building bays—also depending upon degree of hazard—is also provided.

Purpose of the study was to find out if special ventilators or conventional monitors—or both—on roofs provided safeguards against smoke and hot gas accumulations over a fire area. For tests, a scale model building outfitted with fire-and-smoke generating apparatus was used. Heat vented through roof openings represented reasonably accurate relative quantities of heat that would come from a building.

Results showed monitors or ventilators, combined with draft curtains of sheet metal or other noncombustible materials, at specified intervals vent smoke and gases with sufficient effectiveness to aid fire control. Draft curtains on roof underside fence off areas to confine smoke and gases, which are then vented via monitors or ventilators.

Nevertheless, a GM official points



MODELS SHOW UP DEFECTS BEFORE INSTALLATION

Transparent plastic scale models make it possible for Research-Cottrell, Inc. (Bound Brook, N. J.) to test the design on flues for electrostatic precipitators before actual installation is made. Helps insure a better engineered job, possibly requiring smaller equipment. Smoke, as well as thread, ribbon, ground cork, and dust induced into the system under simulated conditions, makes it possible for test engineers visually to observe flow patterns. This uncovers weaknesses and defects in size, shape, direction, or contour of flow and other factors affecting precipitator efficiency.

out: "These findings are amenable to reasonable interpretation. They are not hard-and-fast rules. Nor are they related to any standards or regulations of other organizations. But they are an important research contribution to the problem of emergency ventilation."

Central Soap Supply

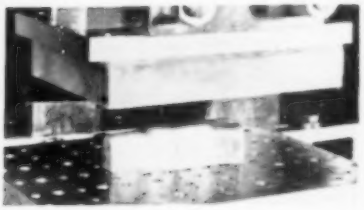
Efficient building design can save on maintenance costs. One of the ways this has been accomplished at the new Connecticut General Life Insurance Company building (Bloomfield, Conn.) was to centralize the liquid soap supply for washroom soap-dispensing equipment.

The liquid soap comes from seven 25-gal. tanks on the building's roof. Flows by gravity to the several washrooms served by each tank. Tanks are inspected once a month, refilled by building service personnel if the supply is low. The system eliminates individual tanks over each washbasin, thus contributing to the simple, modern appearance of the building interior.

Ultrasonic Checker

With this ultrasonic tank, the Research and Advanced Development Division of Avco Manufacturing Corporation (Lawrence, Mass.) can scan castings in concentric circles to detect discontinuities. At the bottom of the 8-ft.-sq. tank is a 7-ft. stainless steel rotating table with an adjustable speed range from 12 to 100 inches per minute. With modifications, Avco now plans to increase maximum scanning speed to 200 inches per minute.

The pulse-echo method of ultrasonic inspection employs a 70-in. specially designed and calibrated probe. This probe has a 270-deg. adjustable crystal holder plus freedom-of-azimuth adjustment through for a full 360 degrees.



New Material Slashes Tool Costs

A saving of $621! And a reduction of 18 days (from 21 to 3)! That's the result Dayton-Rogers Company (Minneapolis) got from using a new two-component tooling material (steel and epoxy resin) to make a punch and die for a cable splice.

Compound 113 (Minnesota & Mining & Manufacturing Company) is specially formulated to fabricate tools for prototype and short-run draws of difficult shapes. Can also be used in simpler metal-forming operations for production runs.

The splice drawn from 0.036-in. cold-rolled steel has some circular and double draws up to 7/8 inch deep. Dayton-Rogers completed the punch and die, ready for mounting, in less than 5 man-hours over a 3-day period. Took $73 worth of material, $36 in labor. Ordinary machine tools without modifications did the machining. Delivery of conventionally machined tools would have taken up to three weeks.

Punch and die were bolted to a 45-ton press in the same way machined steel tools are (photo). Produced 300 pieces per hour during a 4-hour run with negligible wear.

Reprints of the Plant Operating Case Book are available. Price 50¢. For quantity prices write Reader Service Department, FACTORY, 330 W. 42nd St., New York 36.

Cuts Stock-Picking Costs 25%

Key to efficient stockroom handling at Pratt & Whitney Company (West Hartford, Conn.) is this 24-in. belt conveyor. It runs for 90 feet right through the center of the department. Contributes to a 25% cost reduction in department labor costs. In addition, it helps P&W fill orders for thousands of different cutting tools and gages the same day they're received.

Actually this variable-speed conveyor (Arrow Products, Inc., Grand Rapids, Mich.) serves a dual function. To do so, it's divided into three sections by yellow lines painted 6 inches from each edge. The outer 6-in. strips of the belt carry parts from the packing stations to the finished parts storage area about 50 feet away. Here they are sidetracked by deflectors. At the same time, the 12-in. center strip of the conveyor takes parts directly to a 40-ft. gravity conveyor serving the shipping area.

All other changes in the old finished stores area are built around the power conveyor. These involved incorporating box identification, box forming, a rust preventive dip tank, packaging, order picking, and shipping into one department. Combination eliminated 10 complete operations. Will pay for itself in 7 months from resulting savings.

On arrival at the stockroom, finished units are checked, treated with a rust preventative, then passed to six packers (three of them on each side of the belt conveyor). The packers then place tools and gages in properly identified individual containers for shipment.

A printing machine (Markem Machine Co., Keene, N. H.) and a box forming machine (National Metal Edge Box Company, Barrington, N. J.) are located in the same area. They supply packers with boxes, properly marked.

Formerly, boxes were purchased preformed. And they occupied a goodly amount of storage space until they were used. Now box components are stored flat, thereby minimizing storage requirements.

The six packers place tote boxes of packaged tools on the outer six inch edges of the belt conveyor. This takes them to the finished stock areas about halfway down the conveyor, where "sweep-off" arms guide the tote boxes onto side roller tables. Then clerks place tools on the proper shelves.

To simplify stock picking, fast-moving items are placed in the first row of shelves and in Roto-Bins (Frick-Gallagher Company, Wellston, Ohio) running parallel to the conveyor. Slow-moving items and reserve stocks are placed in subsequent parallel shelves. On receipt of four sheets of an 11-part form (three copies of the shipping order and a combination packing list and label), the order pickers fill each order from stock. Then they send it off to shipping on the 12-in. center portion of the power belt.

Source: Denton T. Gallup, Manager, Materials Handling, Pratt & Whitney Company, Inc.

Latest in Atomic Waste Disposal

Containing radioactive wastes in jelly (like chicken in aspic) before burial is the approach General Electric scientists are experimenting with at the Hanford Atomic Plant (Richland, Wash.) If it works, it will eliminate the expense of metal retaining tanks. The GE men have developed a milky-white jelly of sodium silicate containing aluminum. They hope this substance will capture dangerous atomic byproducts such as cesium-137 and strontium-90, contain them safely in burial pits without need for tanks.

Early experiments indicate the heat generated by the radioactive mass inside the jelly globs turns the sodium silicate-aluminum solution to a hard, glasslike material that will imprison the "hot" wastes until harmlessly decayed.

Clock Watchers All

Clock watching is no sin at Triumph Engineering Company (Allesley, England). Even the motorcycle plant's works manager does it. Reason? The clock keeps track of production, immediately alerts production men to assembly line trouble.

Each of two production lines at the plant turns out a maximum of

120 finished motorcycles per shift. Clocks let workers as well as supervisors see exactly how they are doing at any time of day. If production lags, line workers speed up to make piecework rates.

Cost of each clock is about $300. When the clock on the production line is re-set by a key at the end of each shift, the reading on a similar unit in the works manager's office is automatically corrected.

Putting High-Level Emptiness to Work

Need storage space? Bet there's some going to waste right now—up close to your ceiling! Chain Belt Company (Milwaukee) found a good way to use this high-level air space. It stores 300-lb. engines above rows of rotary bins—132 engines in all when racks are full. Ceiling height in this storage area is 13½ feet. This allows a minimum clearance of 2 feet between the top of any engine and any obstructions.

The bins contain miscellaneous parts such as small weldments, bushings, and turned parts. In most cases, these parts weigh less than 5 pounds apiece. Bins are arranged in four double rows of 12-each.

Double racks made by Chain Belt's own shop cover each double row of bins. Roller conveyors on a slight incline form the rack platforms. Result is an automatic first-in, first-out inventory system. Handlers load racks at the high side, unload them from the low side.

Cost of each double rack was $430, with roller conveyors included. Each single storage conveyor is 32 inches wide, 24 feet long. Aisles between rows of bins and racks are 3 feet wide.

Stop Singing Those Floor-Cleaning Blues

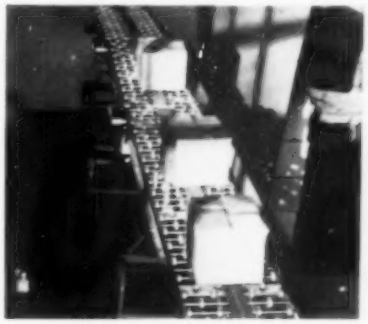
What's new about floor-absorbent compounds? Nothing. They've been available for years. But many plants still use sawdust—or nothing at all—on oily floor areas. They don't realize what modern absorbent compounds can do for them.

Case in point is Victor Equipment Company (San Francisco). After years of sawdust trails all over the shop, it tried Wyandotte Zorball floor-absorbent compound. (Other similar products include Speedi-Dri, Oil Dry, Floor Dry, and Hi Dry.) Victor spreads about 400 pounds per month on floor areas where cutting oils from automatic screw machines and other special machine tools splash. Also uses the compound where oil drips from parts stored in toteboxes. In all, it uses absorbent compound generally on 6000 square feet of wood and concrete floors, partially on another 18,000 square feet.

Results? No more hauling of king-sized bags of sawdust. Improved plant cleanliness with less janitorial effort. Less tracking of oil and absorbent into adjacent areas. Employee morale gets a lift in seeing special provision for taking care of spilled oil.

Now Victor is looking for the time when a non-abrasive compound will be made that won't track at all. That'll be the day? With product research forever hitting new highs, maybe sooner than you think.

Source: F. L. Stettner, Plant Manager, Victor Equipment Co.



No Backsliding Here

Here's a conveyor power booster the U. S. Navy finds mighty useful in decreasing cargo handling manpower requirements. Especially on long runs of gravity skate-wheel conveyor. A 3-in. rough-surface belt in the center of the 18-in. skate-

ASSEMBLY LINE LOOKS LIKE A LAB

And many laboratory precautions are taken in these dust-free assembly rooms. It's here that the all-important gyros for inertial guidance missile systems are put together at the AC Spark Plug Division of General Motors Corporation in Milwaukee. To obtain tolerances as small as a hundredth part of a human hair, gyro assembly work is done under 30-power microscopes. For control of dust and dirt and to insure surgical cleanliness, workers wear nylon hats, smocks, and shoe covers. AC produces inertial guidance systems for the Thor, Matador, and Regulus missiles.

wheel conveyor moves the cartons along. Powered by a ¼-hp. motor, it has a constant speed of 120 fpm.

The skate-wheel conveyor (Centerline Inc., Lodi, N. J.) comes in both 5- and 10-ft. sections. The 10-ft. section weighs approximately 150 pounds, cost the Navy about $600. Adjustable snubber wheels are located at each end of the belt.

Yup, This Plane's for Engineers

A company plane can be good for something besides ferrying VIP's. Take the one owned by Sealed Power Corporation (Muskegon, Mich.). Its primary job is flying company engineers to and from customer plants all over the country. Last year flew over 100,000 miles on this kind of work.

Sealed Power bought its first plane in 1954. Used a member of the engineering staff as a part-time pilot. Since then the company has traded planes three times. Now has a 7-place Aero Commander 680 Super, powered by two 340-hp. Lycoming engines. The plane has an automatic pilot, is equipped for all weather flying. Cost $100,000 plus $13,000 for accessories.

But it's paying for itself even though this is only a medium-size company. Customers get better service. And talents of company engineers and executives are better utilized. Sealed Power lists four reasons for investing in a plane:

. . . *Decentralization* of manufacturing plants. In the past 10 years both Sealed Power and many of its customers have decentralized manufacturing facilities. This means key personnel at Sealed Power must get around fast to service all the customers. Formerly, an experienced staff located in the Detroit area could service most of the company's accounts.

. . . *Customer growth* and product improvement. Due to the nature of the product, Sealed Power engineers must work closely with customers' representatives. And increased use for the major product—piston rings—by manufacturers outside the automotive industry means company engineers have to cover more ground every year.

. . . *Accelerated rate of change.* In the automotive industry, improvements used to be made steadily but slowly. Now changes are a common occurrence. Furthermore, the time lapse between conception of engine modifications and production-line use has been greatly reduced. This trend places greater demands on parts suppliers, means more frequent contact with customers to meet these changing situations.

. . . *Inventory control.* Everyone likes to cut costs by reducing inventory. But this trend occasionally results in an emergency situation when production requirements increase unexpectedly. To meet these emergencies, Sealed Power transports the needed parts to the other customers via company plane.

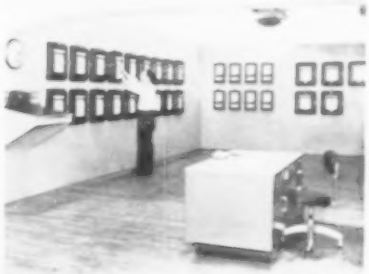
Source: Beryl T. Pickel, Vice President for Manufacturing, Sealed Power Corporation.

Tower-Top Intake for Purer Air

This 40-ft. tower at the front of International Telephone & Telegraph Corporation's new Federal Telecommunication Laboratories in San Fernando, isn't for show. It's a 10x26-ft. air intake that supplies five vapor-controlled rooms used in solid state research.

Intake is mounted atop tower to minimize contamination by automobile exhaust fumes as well as exhaust from 60 roof-mounted air conditioners. These 60 units provide comfort conditioning for people in the building.

After intake, air is electronically filtered, washed, and passed through activated carbon to absorb remaining traces of organic vapors. In the vapor-controlled rooms the humidity is held constant at approximately 22½%, plus or minus 2½%. And air is changed every 3 minutes.



Heat-Treat Control Is Tighter Now

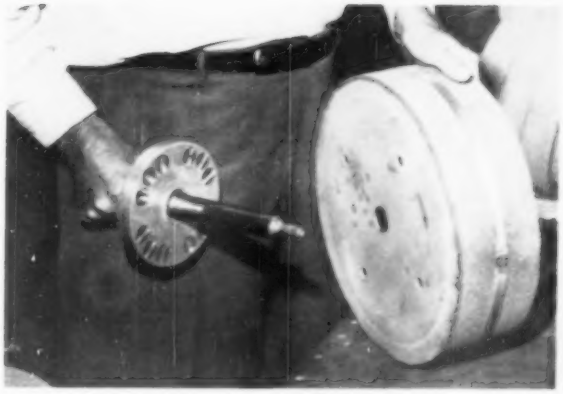
Getting just the right heat-treating specifications for some 900-million parts a year is a tricky problem. That's why The National Cash Register Company (Dayton) moved all temperature controls to a centralized room. This room is off the heat-treat floor, but overlooks the entire department. The move involved addition of some new controls, relocation of older ones.

Now one man oversees the entire heat-treat operation. He schedules the heat treats for incoming jobs, sets the control temperatures, and posts the required information on the instrument charts.

To insure proper procedures, each part has an operation card filed in the control room. This card spells out all heat-treating specifications for the control operator and the men on the floor.

Whenever the control operator wants to pass on instructions to workers in the heat-treat area, he uses a Teletalk unit. As a trouble-spotting precaution, three signal lights are mounted above each Leeds & Northrup recorder-controller.

1. Increases life expectancy 100 times . . .



2. For a $600 outlay, an annual $600 saving . . .

3. Two-man chore now a one-man cinch . . .

4. From lacquer to alcohol for $5000 a year!

How Steady Bear-Down on Costs Pays Off

Cost reduction is a never-ending project at Norton Company (Worcester, Mass.). Guiding light of the program in the Abrasive Division is a 12-man cost reduction committee that meets regularly every other week. This group reviews all methods of reducing production costs. About 3% of the ideas submitted come from an employee suggestion system. Another 20% come from production supervisors. But most of them originate from members of the engineering departments.

To give you an idea of the program's effectiveness, here are four recently adopted changes in the Abrasive Division:

1. Inserts reduce wear on arbors, and will result in a $7000 annual saving, according to test results. It's all done by placing tungsten carbide inserts at critical points where arbors contact abrasives.

Grinding wheels are made to cut steel. Therefore, they present a serious wear problem for the abrasive manufacturer. Especially on steel arbors used in many of the manufacturing and inspection operations like the one (truing) shown above. Here excessive wear occurs during loading and unloading rather than during fabrication operations.

Inserts are replaceable, add substantially to cost of arbor. With tungsten carbide inserts the arbor costs roughly 25 times that of an ordinary steel arbor. But life expectancy is 100 times greater.

2. Speeds static balancing—A specially designed magnetic flange eliminates time-consuming nut tightening in the checking of one type of grinding wheel for correct balance. Saves $600 a year in direct labor.

Wheels have a steel plate permanently cemented to one side. Grinding is done on flat side of wheel opposite plate. During inspection, magnetic flange is placed against steel plate. Holds wheel securely during balancing. Flange cost $600.

3. Makes drum handling easier—Handling 500-lb. drums in the oil storage room is a one-man operation, thanks to the foot-operated hydraulic drum lifter (photo). Formerly, two men using slings and a crane or lift truck were required.

This labor-saving device (Sterling Fleischman, Broomall, Pa.), cost $400. Barrels are lifted between two arms after being secured in place with a three-section, circular metal strap. Strap sections are hinged to admit barrel, clamped together to form a snug-fitting "girdle."

4. Saves on materials—Substituting denatured alcohol for more expensive lacquer thinners saves $5000 annually in spray painting certain types of abrasive wheels. The alcohol works as well as the commercial thinner previously used. But it costs only 70¢ a gallon compared with $2.07 a gallon for thinner.

YOU BE THE ARBITRATOR

THE CASE OF

The Forbidden Lift

Out of the experience of the American Arbitration Association

A Michigan synthetic material plant needed an additional chemical operator, so posted the job in accordance with the union contract. Senior bidder for the opening was Mary V. The company personnel manager readily admitted that Mary would be good at the job. But pointed out her duties would include occasional lifting of 5-gal. jugs of distilled water, weighing about 50 pounds apiece. This would violate the state labor laws, which forbid women to lift more than 35 pounds in the course of their work.

"You can change the job requirements slightly and let a man lift the jug for Mary," argued the shop steward. "That's what we had to do during the war when labor was in short supply. Or you can use machinery for heavy work."

"The wartime situation was an emergency," answered the works manager. "It's more efficient for every operator to do his own lifting. And it just wouldn't be economical for the company to install machines for that part of the job."

Eventually, since the parties couldn't agree, the case went to arbitration. If *you* were the arbitrator, how would you decide?

For the actual decision turn to page 128

Yellow Flags Warn Against Four IMPS

Caution is stressed in the new Allis-Chalmers Manufacturing Company (Milwaukee) safety campaign. Miniature yellow auto racing caution flags on supervisor's desk are reminders to slow down and think when confronted with one of the four trouble IMPS—*improvising, impatience, impulsiveness, impunity.*

Also prominent are decals pasted on auto bumpers, hard safety hats, and tool boxes. Plus the usual posters and banners that are regularly replaced with new slogans and new designs. It all adds up to the most "all-stops-out" safety campaign ever waged at A-C. Can be attributed to the ever-increasing difficulty of promoting safety.

Balcony Mounting Offers Lower Costs

Mounting six motor-generator sets and accompanying control equipment on a balcony cut building costs for the Leschen Wire Rope Division of H. K. Porter Company, Inc. (St. Louis). These units (ranging from 200 to 450 hp.) supply power for a new wire mill located directly below. Are supported on rigid steel bases, then mounted on vibration-absorption pads secured directly to the balcony floor beams.

The balcony carries the six units weighing up to 8½ tons each very satisfactorily. Only building change needed was strengthening of balcony pillar footings. Normally, big motor-generator sets require heavy concrete mounting pads.

Record-Keeping Made Easier

An office copying machine has helped unsnarl the problem of the roving stock-record cards at Trans World Airlines' Kansas City engine overhaul base. Here between 125 and 150 engines are handled monthly. So careful control of over 6000 parts—and records for each—are essential to smooth production.

Until recently the engine provisioning department at the base faced a constantly irritating situation: How to avoid as much as a 20% depletion of files when stock-record cards were sent to purchasing for processing. Thus it wasn't unusual to have over 1200 cards gone at one time, some of them for as long as a month. If during this period important information was needed, someone had to track down the card. This involved an estimated 3 to 4 hours per week.

Now the engine provisioning department makes exact copies of both sides of original cards (photo) on a Thermo-Fax copying machine (Minnesota Mining & Manufacturing Company). Forwards the copy to purchasing. Keeps the original in the department's centrally located file. Thus day-to-day posting continues without interruption.

Operation of the machine is simple. The one-step procedure

takes only about 10 seconds. Original documents along with a piece of copy paper are inserted and copies emerge 4 seconds later ready for immediate use. In addition to copying stock-record cards, the provisioning department uses the copying machine to reproduce correspondence, reports, and memos.

Source: G. K. Weide, Supervisor, Engine Provisioning Department, Trans World Airlines.

Spacesuits for Men in Plants?

Yes. They will be the order of the day for men working in a proposed 3200-sq. ft. gas-tight chamber filled with helium at the Bridgeville (Pa.) plant of Universal Cyclops Steel Corporation. The room (designed by Rust Engineering Company, Pittsburgh) will be built specially for reducing large ingots of molybdenum to useble size by forging and rolling at high temperature (between 3500 and 4000 F.). In air, molybdenum corrodes and disappears as molybdenum oxide smoke at these working temperatures.

The room will be 80 feet long, 40 wide, 22 high. Will house conventional forging and rolling equipment, plus a crane. Ingots will be vacuum-cast outside the room. Then brought in cold through a lock where the air will be exhausted and helium substituted for it.

Operation of forging impactor and rolling mill will be controlled from a console outside the room. But many production operations and all maintenance will require men to work inside the room. They will wear special spacesuits with air for both breathing and cooling supplied and exhausted through hoses.

Each suit will have two sets of hose connections so a man can connect at a new location before disconnecting from the old. After donning the spacesuit outside the room, the worker will connect the hoses in a vestibule. After the outer door is closed, the air around his suit will be largely removed by diaphragms expanding against him. On opening the inner door, he will reconnect the hoses within the gas-tight room before disconnecting from the hoses in the vestibule. Coming out, this procedure is reversed.

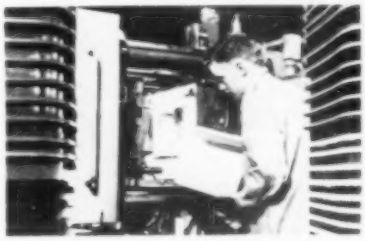
Zip Goes Cargo Into Plane

That blur you see in the center of the above picture is 17½ tons of cargo being loaded into a Lockheed Hercules air freighter. Secret to the fast action (takes about 40 seconds) is a new pushbutton handling system developed by the Georgia Division of Lockheed Aircraft Corporation (Marietta).

The new system mechanically loads and unloads a transport plane in approximately 15 minutes. This represents a 40% saving in manpower to prepare and load freight. And a 90% reduction in idle ground time for the aircraft.

This pushbutton system opens potential handling savings running into the millions for military as well as civilian cargos. All parts of the system with the exception of the pallets are commercially available. And it's relatively simple to operate. Works like this:

Prepacked pallets holding up to 7000 pounds each are loaded on a trailer bed equipped with two steel roller conveyor runs. The trailer is then positioned at the 9x10-ft. opening of the cargo plane, and a tow line is attached to the pallets. This line, powered by an electric winch inside plane, pulls the cargo into the plane. The interior of the airplane has rollers and siderails to facilitate loading. For unloading, a winch on the truck transfers cargo from plane to trailer.



Molds Plastic Parts With a Gush

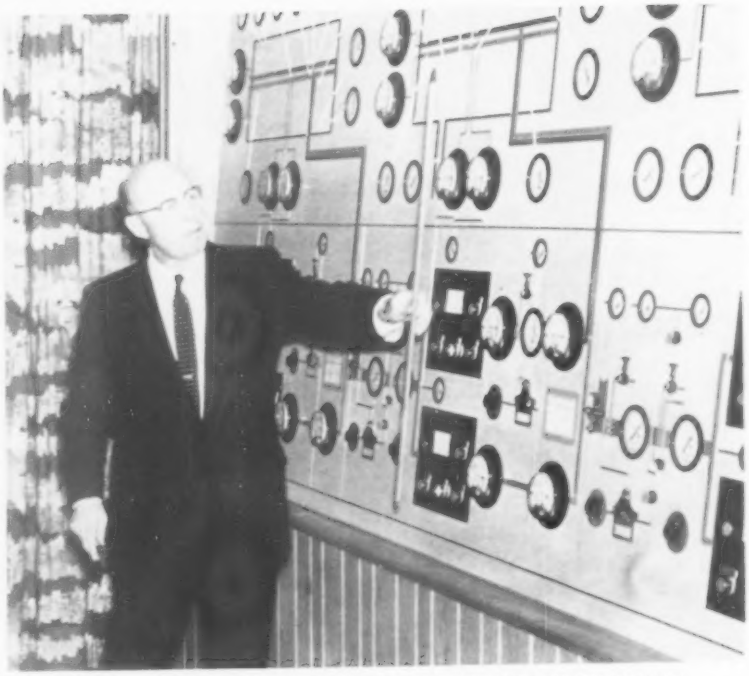
A high-velocity gush of molten plastic is the key to a new plastic molding technique that's expected to save up to 25% of molding costs. Perfected by Columbus Plastic Prod-

ucts, Inc., it's now in use at W. R. Grace Company's Polymer Chemicals Division, Clifton, N. J.

The new "pre-compression" method is known as valve gating. Normally in injection molding the molten material oozes through an opening into a mold cavity. But the new technique holds the material in a reservoir where it builds up pressure. When released, this pressure forces the material to gush into the cavity at high velocity.

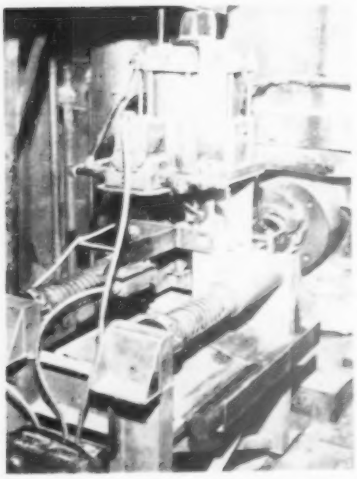
The new method permits multiple-valve gating, thus enabling the molding of larger and deeper pieces. Machines can be a lot smaller, too. In some instances, valve gating will permit molding of parts that could not otherwise be molded, regardless of press size.

Savings come from reduced molding cycles, less scrap and rejects, lower finishing costs. Also, better physical properties and less shrinkage make for improved products. Two other benefits: Molded part weighs less; method lends itself to higher degree of automaticity.



CONTROLS FOR TOMORROW'S PLANT ENGINEER?

Could this control board be destined for the office wall of the plant engineer of tomorrow? Maybe. But right now it serves two useful purposes for Robertson Company in its new Ambridge (Pa.) office building. It takes the pulse of air conditioning comfort throughout the building and eliminates any guesswork by providing accurate data for solving air conditioning problems. And it gives Robertson engineers a good talking point in explaining their product—Q-Air Floor systems.



Guillotine Cutter With Quick Payoff

It cost $1650! Saves $4000 annually in labor alone at the Bristol (R. I.) plant of Kaiser Aluminum & Chemical Corporation. When used in conjunction with a 2100-ton lead press, the guillotine cutter chops up a continuous 2⅜-in. solid rod extrusion into 12½-in.-long billets. Formerly these billets, used to produce lead identification strips in a smaller press, were manually molded.

Advantages of the new method are safety, quality, and economy. It eliminates hazardous pouring of molten lead into small, open molds, and produces a better-quality billet, free of pouring contaminates. Since the cutter is portable, it can be used with any available press, stored in an out-of-the way location when not in use.

From the press, the continuous rod moves directly into the cutter and past the cutting point until the leading end contacts a limit switch. The limit switch activates the pneumatic-powered guillotine blade that shears the rod in one stroke. Blade mechanism supported on a carriage travels with rod during one-second cutting cycle, is returned to normal operating position at end of cutting cycle by spring pressure—where it remains until the next cut.

Source: A. W. Kolle, Industrial Engineering Manager, Bristol Plant, Kaiser Aluminum & Chemical Corp.

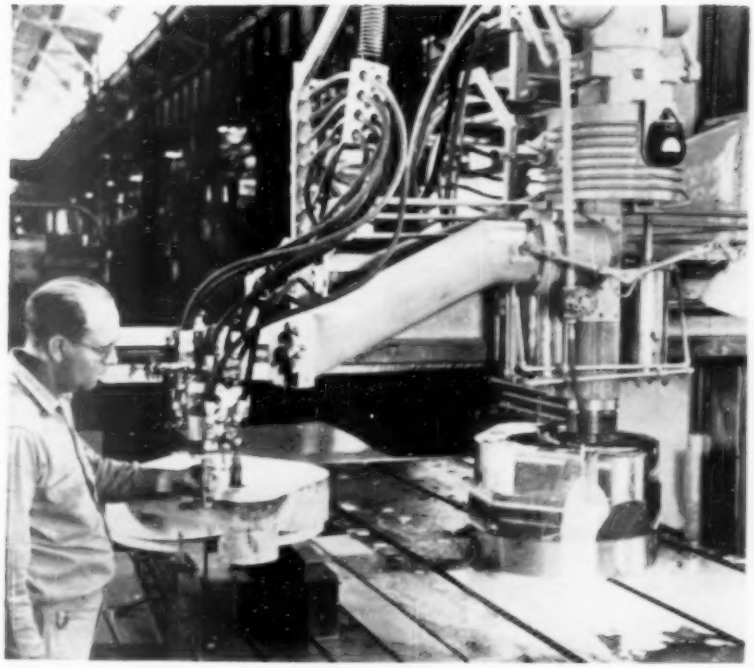
Taking the Mystery Out of Incentives

Ever wish employees shared management's confidence in the fairness of your incentive system? Officials of Lamson & Sessions Company (Cleveland) did. Cause for their concern was an employee attitude survey that showed wage incentives were poorly understood, presented a morale problem. Result, a program to explain the system in detail to every employee affected by it.

To date some 60 groups from all L&S plants have attended. (That's 80% of the total number affected.) And classes will be continued until all—including top management, supervision, and union stewards—have participated. Attendance has been close to 100%. And employees have been known to come in during their vacation to catch a session.

The course is given in four weekly 1½-hour sessions:

. . . Session one is an introduction to the course. The employees are greet-



OLD MACHINE LEADS A BRAND-NEW LIFE

This "new" three-dimensional, tracer-controlled milling machine at National Supply Company's Torrance (Calif.) plant isn't new at all. It's an old open-side planer, modified so that all machine movements are hydraulically operated. The company added a tee-slotted plate to serve as a template mounting base. Attached to outboard side of table, it allows positioning at any point on its 16-ft. length. A 25-hp. variable-speed milling spindle (60 to 3000 rpm.) replaced the planer tool mount.

ed by the factory manager, meet all the plant standards men. They see the film "Mighty Labors," which explains the industrial engineering profession. And they get an outline of the next three sessions.

. . . **Session two** covers work measurement. It's a lecture session where work elements, duties of standards men, and common systems for work measurement are described.

. . . **Session three** covers effort (tempo) rating. This is a participation program built around the Barnes walking film and several other tempo rating films. Employees get rating sheets and instructions for filling them out, then try their hands at rating. Correct ratings are given at the end of each film, and employee's completed sheets are picked up by the instructor.

. . . **Session four** concentrates on rating results and payment procedure. Employee ratings from the prior session are entered on individual charts for each participant as well as on a master chart for the entire class. Charts show discrepancies between employee "observed" ratings and "actual" rating. In every case to date, over-all class ratings have been more strict than those recommended in the film. This makes the point clear that standards men are specially trained to provide for equitable payment for work done.

This final session continues with an explanation of rate setting and payroll procedures. And at the completion of the course each employee is presented with a class picture taken during the second session. The class picture also appears in the company paper.

Lamson & Sessions has been conducting these courses for about seven years. Has purposely avoided rushing classes through. Each class has fewer than 15 employees, is worked into the training department's time budget as a regular function. As with other company training, classes are on company time.

Source: Leo Lesnak, Personnel Director, and Peter Stoicoiu, Training Coordinator, The Lamson & Sessions Co., Cleveland.

CASE BOOK CAPSULES

Aluminum oxide film less than a millionth of an inch thick is being used at Westinghouse Research Laboratories (Pittsburgh) to support sensitive material for electronic image tubes. Lets electrons penetrate sensitive material without interruption.

Longest plastic pipeline to carry corrosive chemicals is 6200 feet long. Now in round-the-clock use at Ashtabula, Ohio, it links plants of Mallory-Sharon Metals Corporation and U. S. Industrial Chemicals Company.

Portable water-cooling tower for field use with mobile liquid carbon dioxide generating plants has been developed by Badger Manufacturing Company (Cambridge, Mass.) and Army Engineer Research and Development Laboratories.

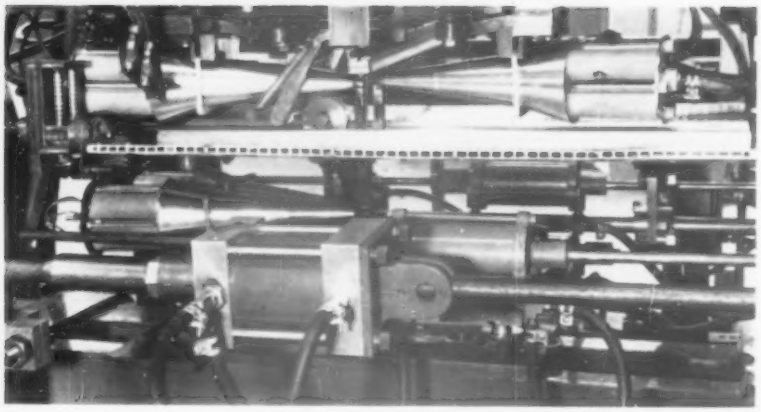
New interferometer to measure parallelism of opposite faces of gage blocks more rapidly and conveniently has been designed by the National Bureau of Standards, Washington, D. C.

King-size mirror (144 x 100 inches) has been delivered to General Electric's Laboratory (Schenectady) for use in photometric research and testing by Falconer Plate Glass Company, New York.

World's largest furnace for electric melting copper has 90-ton bath capacity. Produces 30 tons of high-quality, tough-pitch copper per hour at American Smelting & Refining Company, Perth Amboy, N. J.

New seal of quality issued by National Association of Pipe Nipple Manufacturers (New York) certifies first grade steel nipples of new, full-weight mill pipe conforming with ASTM specs.

Waste black liquor from the Longview (Wash.) paper mill of Longview Fibre Company is condensed in huge evaporators, then burned as fuel. Payoff: fuel savings, no water pollution problem.



New—Ultrasonic Seam Welder

Now they're welding aluminum to aluminum in a continuous seam, without a sour note. How? Ultrasonic waves induce molecular transference (or plastic flow) at the interfaces of two metals, but at temperatures below the melting point.

Hero of the piece is a fully automated welder. It was developed by Gulton Industries, Inc. (Metuchen, N. J.). Is being produced for classified government work. Although it's similar to electric seam welders, the ultrasonic machine joins parts at speeds up to 200 inches a minute, can weld any kind of metal to any other kind of metal. Cost: about $15,000.

Ceramic transducers (at bases of each metallic cone) take a 500-watt current, convert it into strong vibrations that hit the metal cones and become high-pitched music. The cones acting as amplifiers set the electrodes mounted on their trips to moving rapidly up and down in the range of 10,000 cycles. This motion does the welding.

The prototype shown above welds corrugated sheets to long, curved aluminum extrusion. It can weld eleven different radii without modifications. And although it is designed for making 30-in. seams, any length seam can be produced by slight modification of mechanical equipment. The whole machine stands 13 feet high, 12 feet long, 10 feet wide. Weight: About 3 tons.

This fully automatic welder has eight heads. Four operate at the same time. And it's self-monitoring, too. Constantly checks itself against failure. If something goes wrong, the machine automatically shuts down. But, so long as it is operating satisfactorily, the operator only stacks the sheets or pieces, turns on the machine, and removes the finished work.

No Sooner Seen Than Dictated

Rapid communication is essential to efficient operation. In line with this, E. I. duPont de Nemours & Company has found it pays to equip engineers with portable dictating equipment. That way men in the field—like the materials handling engineer at the Newport (Del.) plant—get their notes on the record while they're still hot.

The recorder is handy and light, weighs no more than a camera. It's battery powered and holds enough magnetic tape for an hour's use. Also, mistakes can be erased to insure greater accuracy. Added dividend: When engineers record their observations rather than write them down, chances are they'll include a lot more useful details.

Puts Zing Into Your Maintenance Force

It's high time maintenance supervisors got on the "better communications and leadership" bandwagon. That's the gist of a talk by W. E. Fore, plant engineer at Los Angeles Division, North American Aviation, Inc. Mr. Fore stated his views at the recent Plant Maintenance & Engineering Conference in Chicago.

In all, North American Aviation uses eight human relations techniques to improve operations within their maintenance force. Five are fairly commonplace. But the other three are unusual:

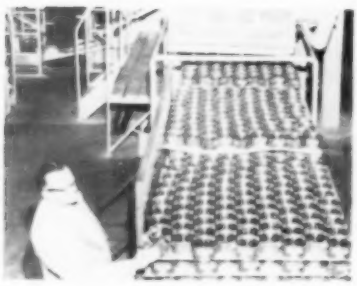
. . . *Performance review.* This throws 50 production departments and five service groups (including three maintenance) into competition for a monthly award dinner and plaque sponsored by the factory manager. Contest is based on nine factors: cost of service (direct hours), schedule position, production control (where applicable), emergency service or rework, supporting labor, lost time, safety, housekeeping or materials handling, and non-productive material utilization.

Important fact about the performance review: A way has been found to let maintenance groups compete with production departments. In the last 12 months, maintenance groups have won the contest twice. And all three maintenance groups have regularly placed in the top ten. Result is higher morale than was possible without a competitive incentive. More pride in workmanship than ever before.

. . . *Employee counseling program.* This two-year-old service at North American requires regularly scheduled private counseling sessions between an employee and his supervisor. First-line supervisors are required to counsel all their employees, while higher levels of supervision counsel 10 to 15% of the employees under their direction. Most employees welcome the chance to "sit down and chew the fat with the boss." However, a few resent the program as "meddling." Over-all, Fore feels the counseling program is a "very good tool for the supervisor." It improves "his personal leadership skills and . . . his relations with his work force."

. . . *Communications meetings.* They

form a two-way information channel between management and employee. There are seven regularly scheduled meetings every week, including one held by first-line supervisors with their employees. The other six are attended by various management levels. Result: Foremen gain employee confidence as a reliable source of information. And they're usually a jump or two ahead of the rumor mill because of the close-knit communications plan.



Depalletizers Speed Empty Can-Handling

Empty coffee cans get a fast brush-off in automatic depalletizers at the new J. A. Folger & Company plant (Los Angeles). Each machine feeds cans to the plant's conveyor system at speeds up to 240 per minute. Next stop: Automatic filling.

Cans arrive at the depalletizing machines (American Can Company, New York) on wooden pallets with light fiberboard separators between layers. Each pallet holds 1080 1-lb. or 540 2-lb. cans. Once loaded onto the approach to the depalletizer, a chain drive conveyor indexes the pallets forward until they reach the depalletizing station.

Here an automatic elevating mechanism raises each pallet so one layer of cans at a time is skimmed off. This action is controlled by the single operator. He also removes the layer separators manually. Empty pallets are automatically ejected from the depalletizer during the indexing cycle.

After cans are swept from a pallet, they are reoriented from a vertical to a horizontal position. Then they roll down a runway to a vertical conveyor tower that lifts them about 22 feet, transfers them to the overhead conveyor system.

Glazed Cement Looks Like Tile, Costs Less

Low maintenance cost was the prime reason many of the interior walls were covered with "glazed cement" in the new *Miami (Fla.) News* building. Most of the walls covered with this hard-surface material are located in the industrial portion of the building. In areas like the composing room, stereotype department, paper storage area, and mail room, where they get the roughest treatment, heaviest wear, and greatest exposure to dirt. But it was also used in parts of the office area like corridors and the cafeteria.

In The Miami News building, glazed cement produces an attractive wall finish similar to glazed tile, was used in a wide variety of colors. But it cost only about half as much as structural facing tile—80¢ per square foot *vs.* $1.50.

Glazed cement (Ceramic Building Materials Corporation, Newark, N. J.) is applied by spray, trowel, or brush in three or four steps. First, one or more base coats are applied to give the decorative effect. They are then followed by the application of a seal coat, plus a glaze coat of transparent material to produce the tile-like finish.

No Time Like Now to Go Recruiting

Demand for college graduates seems to be leveling off in engineering and technical fields. So reads Frank S. Endicott's 1958 report on "Trends in the Employment of College and University Graduates in Business and Industry." Mr. Endicott is director of placement at Northwestern University, Evanston, Ill.

The survey covering 223 concerns shows a few large companies are reducing their requirements. Had more such companies reported, the total need for engineers for next year would have shown a decrease. On the other hand, a significant number of companies hiring 5 or 10 men each year reported an increase in their needs. It seems likely large companies were fairly successful in hiring college men last year and have now reached a point where their needs are stabilizing.

In recent years, larger companies with well-organized recruiting programs have tended to dominate fields where their needs were great. However, with enrollments on the increase in our colleges and universities, it seems likely smaller concerns will now play a greater role in employing graduates.

Moral: No longer any reason to put off hiring the young industrial, manufacturing, or plant engineers needed to make your operation more efficient. You can get 'em if you look hard enough.

Keeps Out Wintry Drafts and Blasts

Shielding workers from drafts and cold blasts is no longer a problem at Central States Paper and Bag Company (St. Louis). It uses a clear plastic draft shield that stops drafts, but still gives the full benefit of any natural light that's available. Simple but effective.

Central States makes the shields —up to 100-ft. long—of heavy-gage polyethylene. Reinforces the tops and inserts grommets for ceiling hanging as a transparent wall or sliding partition. During warmer weather, shields can be folded and stored with little effort. Added advantage: Polyethylene shields take up little working space.

Dramatizing Tool Breakage Costs

Display boards dramatize the high cost of perishable tool breakage at the Pomona (Calif.) plant of Convair Division of General Dynamics Corporation. Each board bears a display of broken tools and their

Contributions from readers reporting experiences will be welcomed. No need for fancy writing; just a clear concise statement of facts. If you have photos or drawings, be sure to include. We'll edit for the Case Book. Contributions accepted will be paid for at time of publication. Address: Case Book Editor, FACTORY, 330 West 42nd St., New York 36.

prices. Aim is to reduce a $1000-per-month breakage cost.

Convair management thinks many tools are broken unnecessarily. Could be avoided if operators checked them before starting a job. The program's goal is even more important in view of a 20% increase in the initial cost of perishable tools over the past two years.

Panelboard Permits One-Man Control

"One picture is worth a thousand words," sums up the designer's thoughts in developing this rotary dryer control. The schematic diagram painted on the board (top) shows the flow of material, air, fuel, and the location of the driving motors and burner. The unit was designed and manufactured by Standard Steel Corporation (Los Angeles) for drying silica sand at the Owens-Illinois plant in Cuba.

All dryer operations are controlled from this panel, including the acceptance or rejection of feed. The panelboard enables one man working part-time to supervise the entire drying operation. Once the unit is started, the operator performs his other plant duties. A colored light and a sound signal give immediate warning of trouble. And complete accessibility of all instruments, lights, and switches is provided from the front of the board.

All motor disconnects for the dryer are located at lower right in the panelboard, and all motor starters are in the open middle section. To eliminate banks of pushbuttons, light-signal buttons that actuate circuit breakers when pressed replace conventional stop buttons.

The panelboard can be lock-started or lock-stopped (by individual circuits or the entire control). A different key for each starter button is used. Chains are attached to each key so an operator removing any key can hang it around his neck. This procedure reduces the chance of misplacing keys. More important, it assures the operator that he can work on any circuit in complete safety because only he has the key to its actuation. Also, the operator has the key with him when he needs to operate the starter switch at the motor itself (where the code requires that a starter be located there).

A small writing desk is tucked away under the temperature recorder at the upper right. Provides storage space for papers, pencils, and miscellaneous charts.

HANDY HOSE STORAGE

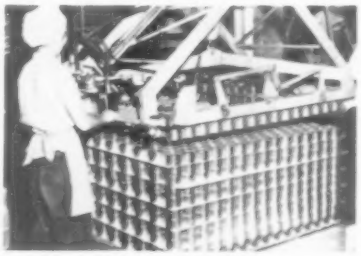
Three of these storage racks keep hydraulic hose handy and ready for use at Boeing Airplane Company's flight test hangar. Each rack has nine containers made from surplus 55-gal. steel drums. Drums are cut in half, the edges rolled and then welded to a steel pipe column mounted on a channel iron base. Castors and a coat of paint complete the job.

YOU BE THE ARBITRATOR

Continued from page 122

The award—The arbitrator agreed with the company. He said the union contract permitted the company to match qualifications and ability to the job. But it did not compel the company to change the job to meet an employee's ability.

Caution: The award in this case is not an indication of how other arbitrators might rule in other apparently similar cases. Arbitrators do not follow precedents. Each case is decided on the basis of the particular history, contract, testimony, and other facts involved.



Cuts Can Handling Time 65%

Suction helps transfer unlabeled cans of pineapple juice from production lines to pallets for warehouse storage faster, more efficiently. The machine can pick up 210 cans at a time, transfer them 10 feet to a pallet where a blast of air breaks the suction pull. And all in 30 seconds. Heavy sheets of paper separate layers of cans.

The new storage method saves 65% of handling time formerly involved. And the compact palletized loads save about 30% in storage space. Formerly, cans were stored in cartons while awaiting labeling and shipping instructions. By using pallets, the extra operations of packing and unpacking cartons have been eliminated.

The device was perfected by Hawaiian Canneries Company, Ltd. (Kapaa, Kauai). Approximate installation cost of machine: between $6000 and $15,000, depending on attachments. Units can handle several different can sizes so long as the can diameter is the same.

Around the whole roof . . .

. . . and up and down the sides

Now—a New Lift for Maintenance...

. . . and a promise of new efficiency. Today this portable telescoping elevator makes it easy to wash acres of glass. Smart as you are, you'll see other uses.

NEW KIND of lift (photos above) may be your best answer to a raft of puzzling problems in production and maintenance.

With this lift it's a cinch to wash acres of windows at the new 3-story facility of Connecticut General Life Insurance Company, Bloomfield, Conn. But that's only the beginning of its usefulness. Take a flight into fancy. The new lift could mean, for example, that you could hang scaffolding from the ceiling instead of cluttering up the production floor. Roll scaffolding into position along overhead tracks instead of around machines and equipment. Speed tiered storage, product assembly, interior and exterior painting. Provide a working platform at any level from ceiling to floor. Obtain a portable elevator at any point in the plant without the trouble and expense of building a fixed elevator shaft.

Improbable? Not at all. Although uses in the plant are still in the idea stage, skyscrapers like Lever House in New York and Alcoa's new Pittsburgh headquarters are making busy use of these cable lifts to keep their glass exteriors shiny and bright. (At Alcoa the completely glassed-in area—lobby and foyer—is only three stories high. A lift, suspended from tramrails inside and outside, helps workers keep both sides of the glass clean). Without the lifts, workers would have to dangle over vast reaches of glass. Even with the lifts, it's a full-time job to keep the windows clean. Same for Connecticut General's glass house—except that window washers there would have to travel long horizontal (instead of vertical) distances.

How it works—Manning & Lewis Engineering Company, with help from Otis Elevator Company, designed and built Connecticut General's lift-and-cage installation.

The lift is controlled by pushbuttons from within the cage. It's mounted on a roof-top track that holds a narrow, collapsible operator's platform (left photo above). The platform can negotiate short-radius turns. The usual T-rail with limited span was abandoned in favor of structural beams spanning 12 feet between supports, thus cutting by 25% the number of supports needed. The unit also can move from the main outside rail to any one of four rails inside courtyards by means of transfer cars that interlock with building tracks.

Here are other features of the new device:

. . . *Special* tractor-type traversing drive can round sharp curves.

. . . *Timing* and track interlock devices make sure operator's platform will clear canopies and other building obstructions.

. . . *Operator's* platform extends so that he can move under the first-floor recess.

. . . *Telephone* lines link operator and building superintendent.

ANSWERS TO HANDLING ARE A SIDE-LOADING TRUCK AND SPECIAL SHELVES.

$350,000 From Smarter Handling

Materials spoiled? Costs soaring? Then make handling your next cost target. With this system, never a scratch on materials, big handling savings.

PERFECT material was the requirement. It wasn't a simple job. At Convair (Fort Worth) division of General Dynamics Corporation, there was the old story of excessive handling damages, high inventory costs, difficulty in meeting production schedules.

Why? Because sheet stock took a back seat to production—was stored wherever there was room. All kinds of sheet were stacked all kinds of ways (right photo, facing page) in this supersonic aircraft plant.

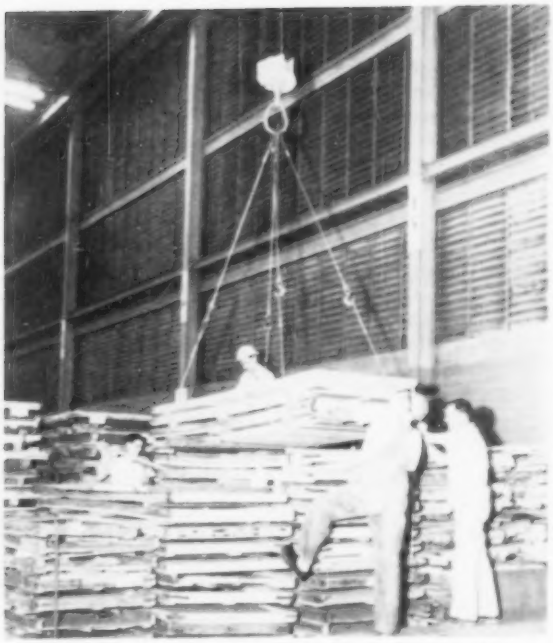
That's all changed now. A slick new storage and handling system (above and facing page, left) has racked up these pluses:

. . . *Fast*—New system is 75% quicker than old. Stock is now rushed from storage to production in 10 minutes. The old method used to take up to 45 minutes.

. . . *Sure*—Fixed positioning of material eliminates constant rearrangement. Before, materials were moved back—and piled up—when production needed more space.

. . . *Clear*—No mixing of material. Inventory easier to see.

NEW WAY—Orderly system for sheetmetal storage keeps kinds and gages of stock separated, protects stock against damage, makes it easy to store and remove inventory.



OLD WAY—Jumbled stock was subject to damage, delays in delivery to production. Workers sometimes took up to 45 minutes to find the right material and get it to its destination.

One more big plus: Entire system, costing $260,000, will pay its way in less than a year. Annual saving in labor and damaged material alone is now $155,000. After the operation gets into full swing, annual savings will soar to $350,000.

OLD WAY—DRAWBACKS

Sheetmetal stocks used to be stored in flat lugs (crates with runners) stacked in tiers about 2 to 10 feet high. Both materials and gages were mixed. If needed material was at the bottom of the heap, a monorail lifted off top crates. That took time—both in locating the item and in handling it. Often material got damaged by slings that lifted crates. Also, materials in open lugs were easy prey to gritty shoes of workers who had to walk across stock to get to other crates.

Inventory was a nightmare, too. Materials were scattered over 80,000 square feet of plant floor.

NEW WAY—WITH SAVINGS

The new storage system consists of 228 racks that will store 11.6-million pounds of stock. Racks are ¼-in. fabricated steel. Each rack is 14½ feet high, 14 feet long, and 4½ feet wide. Racks sit back and slightly apart. Each unit will take a 5x12-ft. lug. Four adjustable shelves hold 5700 pounds each. Top decks of the racks are stressed for 12,500 pounds. Stock wider than 5 feet, longer than 12 feet, is stored on top of racks.

Aisles between racks are 12 feet wide. Each rack section has capacity of 52,000 pounds from floor to top deck. Floor area under bottom shelf holds another 17,000 pounds. Rack system takes 45,000 square feet of space. (Old system took almost twice as much.) Shelves can be adjusted in 4-in. increments.

Stock is handled only twice—when slipped into racks, and when taken from storage to production.

Materials are separated in marked shelves. Only the top lug is open. That makes inventory counting easier because checker only has to check the tag of the banded lug, then count stock in open lug.

Although stock is normally laid flat on a shelf, materials can be stacked vertically on floor underneath the shelves.

It's easy to find material now. A supplemental deck of cards lists code numbers that are numerically filed. Stock is almost at the fingertips of materials handling men. All they have to do is check for row and shelf, then move in with the sideloading fork lift.

HANDLING IN A HURRY

Key to new system is "Traveloader," the sideloading fork lift truck (Baker Industrial Truck Division, Otis Elevator Company). Truck has a 10,000-lb. capacity, can lift to 14 feet. Now, only materials on top shelves move by monorail. And these monorail moves have been slashed 90% by the new system. To make a move by monorail, Convair calls in the crew. And that's another saving. Crews no longer have to be stationed in the area.

The Traveloader picks up a package parallel to the racks and drives down the aisle after load has been centered (but still in a parallel position). Load is lowered to an easy working height at end of the racks, where an A-frame takes over for delivery to production. Lug then goes back on the shelf.

The materials department now makes the first cut in the stock. Before it took so long to find the right stock that it was a hand-to-mouth existence—and production made the first cut with no particular regard to saving material.

FACTORY
MANAGEMENT AND MAINTENANCE

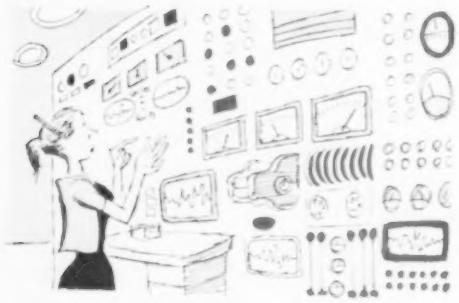
HUMAN RELATIONS

By LESTER R. BITTEL, Manager, Editorial Programs, FACTORY

Best Way to Guard Hearing

"The best ear protection is the one that's worn," declares a new free booklet on industrial hearing conservation. The booklet, designed for management people, details information on selecting and fitting protective ear devices.

For a free copy of *Industrial Noise and Hearing Protection*, write Publications Editor, Accident Prevention Department, Employers Mutuals of Wausau, Wausau, Wis.



Human Flaw in Computer Chain

To err is human. And few things point this fact up like the problem of feeding data to a computer. When handling figures, human beings make about one error for every 200 digits. On the other hand, data processing machines make about one mistake in every one billion-billion digits.

Consequently, engineers must devise a way to increase the accuracy with which employees and managers can communicate with machines.

This concern was expressed by engineering consultant S. L. Seaton at the recent annual conference of the American Institute of Electrical Engineers. Mr. Seaton suggests that human accuracy with long lists of numbers can be improved. For instance, numbers are easier to identify when they're written with tails extending below and above the line. For the same reason, lines of lower-case letters are easier to read than all capitals.

Perception might also be improved, said Mr. Seaton, by adding a color for each number or a characteristic weight of line.

What does this mean to you? It emphasizes the need for alertness in analyzing and re-programing machine operations of all kinds. "And," says Mr. Seaton, "it is clear that to use such an unusual instrument as the human brain for trivial and routine operations is a waste of our resources."

Pitfalls in Group Approach

Popular emphasis on the group approach to managerial problems sometimes fogs an important objective of group effort—critical discussions and analysis of problems. In the desire to gain group agreement in meetings, cautions Dr. Eugene E. Jennings, writing in the *Journal of the American Society of Training Directors* (Jan.-Feb.-Mar. 1958), too much emphasis may be placed on comformity. "In numerous cases," he says, "group agreement is desirable because it helps bridge the gap between knowing and doing. And if everyone agrees on what is to be done, the decision stands a better chance of being carried out."

But it's a mistake, Jennings implies, to become too devoted to the word "participation." Better to encourage an individual to exert his own individuality in a situation, to seek the facts regardless of their nature and without the pressure of conformity for conformity's sake.

Toward a Truly GAW

Every employee—production and office—on a salaried basis. That's the latest move at International Business Machines Corporation.

The plan—which puts all IBM's regular hourly rated domestic employees on a salary basis—affects 20,000 plant workers. Remainder of the company's 60,000 U. S. employees were on salary already.

Until Feb. 1, 1958, hourly rated employees sustained a loss of income for the first three days of absence due to sickness or accident. Now they receive full pay from the start, are compensated for authorized absences for personal reasons. But former hourly employees will continue to be eligible for overtime pay on same basis as in the past.

Not many concerns can emulate IBM's liberal benefit program, but few will be able to avoid completely the effects of this precedent-shattering move.

60-Minute Men

Trying to squeeze the most out of your employees' work days this year? Foolish question. But here's an answer that makes sense. Thompson Products, Inc. (Cleveland), has launched a 60-Minute Man program. It's aimed to inspire employees to make the most of their job time during the critical first and last 30 minutes of each day.

"There are conservatively 60 minutes during the day when we have conspicuous losses," says J. D. Wright, company president, in a letter to all employees. "These are the 30 minutes immediately after the beginning of the shift and the 30 minutes before the shift officially comes to an end."

To win support of this drive for a full day's work, TP has designed a poster campaign and distributed information kits for supervisors to help them discuss basic program objectives with workers. In addition, company officials presented the plan to union representatives, who agreed they'd support the plan to reduce costs in order to hold present business and attract new orders.

Best Bet on Brainstorming

Quick! Before it can slip your mind get a copy of Charles Clark's brand new book on creative thinking: *Brainstorming* (Doubleday & Company, Inc., Garden City, N. Y., $4.50.)

For all true believers, as well as those with little faith in brainstorming, there's real meat here. You'll find seads of valuable do-it-yourself tips on creative thinking. For instance, in his chapter "Troubles are a Brainstormer's Best Friend," Charlie tells of one production genius who refuses to hold meetings in his front office. When there is a problem he goes out to the shop, to the spot where a machine is broken down or a log-jam of parts is piled up. "Often I see an entirely different problem from the one they tell me about," he explains.

Another executive holds regular sessions called "Clouds on the Horizon Meetings." "We try to smoke out little troubles before they develop into big problems," he says.

And the Downingtown Paper Company added a new suggestion system in which employees are asked to submit entries to find the Problem of the Month.

These and many more examples keep Charlie's book—as befits the work of an old-time FACTORY contributor—down to earth, its vision in the stars.

Influencing Plant Neighbors

Want to keep in touch with new people in your community? To keep spreading the good word about your plant? Then try circularizing new families called upon by the Welcome Wagon hostesses in your town.

That's just what General Electric Company is doing in Erie, Pa. The company sends all newcomers a welcome letter and a pamphlet that tells "The General Electric Story." This effort reached 80 local families in December 1957. And opened up another important channel of community influence.

Newest Management Need?

Could it be that the "missile age's" premium on product reliability is just a forerunner of a similar but intensified demand on all management? As any quality control man will tell you, quality must be built into the product. But it takes more than precision machines to accomplish this. It takes a workforce that lives and breathes a respect for reliability of design and manufacture.

Listen to H. Thomas Hallowell, Jr., president of Standard Pressed Steel Company, Jenkintown, Pa., as he makes the point:

"We are living in an age where things are moving faster—mentally, physically, and psychologically; where we are dealing with bigger figures everywhere; where as the size of things goes up, the little things become more important; where there is a growing demand for better parts, more economical parts, truly interchangeable parts; where national defense may hinge on a mere handful of guided missiles; and where in industry almost anything is less costly than a customer's complaint that can lose business."

And here's Hallowell's solution to the problem:

"We must hurdle in this country the obstacle of continued use of too much American production-line thinking at a time that definitely calls for more 'missile age' thinking . . .

"In a reliability age part of management's job is to be sympathetic to quality as a way of life. Mere mechanical performance is not enough in itself. We must add the psychological factors of environment, interest, and desire of the people who are working on each of the countless parts and on their final assembly into completed units.

"There must be greater pride of accomplishment than we find in our present-day assembly lines making aircraft, automobiles, and washing machines."

ASSETS 1945	LOANS 1945	MEMBERSHIP 1945
153 Million	35 Million	1.22 Million
TODAY 1300 Million*	**TODAY** OVER 900 Million*	**TODAY** OVER 4.5 Million*

*Based on latest available U.S. Dept. of Health, Education, Welfare figures.

These key growth factors show how . . .

Credit Unions Are Booming

This new opinion survey will give you a fresh look at a growing in-plant business that's easing workers' worries, unveiling leaders, even lifting output.

CREDIT UNIONS can be top-notch human relations tools, plant managers are finding out. That's a switch. Not long ago they thought a credit union was a nuisance.

Not only does a credit union boost employee morale. It also reduces pay advances and garnishments and lightens employee money worries that can affect production. Loan sharks swim in lonely seas when workers have a credit union.

What are plant men saying? This sampling, from a survey by CUNA (Credit Union National Association, Madison, Wis.) of the 7741 credit unions in the manufacturing industries, points up four major benefits from credit unions:

. . . *Fewer* worker money problems.
. . . *Higher* worker morale.
. . . *Greater* productivity.
. . . *Better* leadership development.

Says Francis Blomquist, general supervisor of plant accounts at Sherwin William's Chicago plant: "We have fewer financial problems now, and better employees. And with payroll deductions, many save where they wouldn't before."

R. L. Jett, assistant treasurer of Vulcan-Hart Manufacturing Company (Baltimore), says: "We believe that the credit union has contributed much to morale, character, and education of our employees . . . They have a greater sense of responsibility, leadership and loyalty."

B. Nicholson, industrial relations manager for the Florence Stove Company (Kankakee, Ill.) thinks reduced financial worry "has resulted in a reduction of absenteeism, a better safety record. These, in turn, have reflected themselves to a degree in better quality and increased productivity."

George M. Ashworth, personnel director at Whitaker Cable Corporation (Kansas City), thinks the credit union "has pointed a finger to those capable of performing better jobs and eligible for advancement to the management team," through administrative training in running the credit union.

HOW IT WORKS AND GROWS

How does a credit union work? CUNA calls it "economic democracy." A group of workers pool their money and then make loans at low cost to pool members. A paid bookkeeper or manager keeps records. Volunteers do the rest.

Loans are made on the basis of the character of the borrower. As a rule no collateral is required. Members of similar occupational groups, associations, or residential areas are the major organizers of credit unions. Most companies provide rent-free quarters. Some provide personnel for administration. Normally, though, management doesn't interfere in credit union affairs.

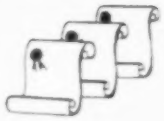
About 9000 of our 17,000 credit unions are chartered by states. Remaining 8000 are federal credit unions organized in accordance with the Federal Credit Union Act of 1934. Federal credit unions are chartered, examined, and supervised by the Bureau of Federal Credit Unions of the U. S. Department of Health, Education, and Welfare. Special requirements: Unsecured loans may not exceed $400; no loan may run for more than 36 months; interest may not exceed 1% per month on unpaid balance.

Rapid growth—Credit unions are now booming. During 1956 assets grew 24% to total $3.3-billion. Membership grew to 9.1-million. Credit unions lent an average of $261 to each borrower while members saved an average of $328 each through share purchases in 1956.

If you think credit unions aren't important to your workers, look at these figures. They show how many credit unions there are among manufacturing industries: food production, 1153; machinery, 832; fabricated metals, 703; primary metals, 652; printing and publishing, 551.

ACTIVE CHARTERS

1945



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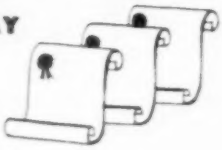
TODAY



OVER
8,000*

SOLVING MONEY WORRIES

Credit unions are making management sit up and take notice. More than that, they're giving management a pleasant surprise in reducing worker financial problems.

Consensus: Credit unions today do a job that management, in spite of streamlined employee relations programs, has been unable to do.

F. J. Hekma, vice president of Palmer Engine Company (Cos Cob, Conn.), gives evidence: "Before the credit union was started we were continually bothered by requests for advances from employees who were not only in debt but harassed by high-rate loan organizations. We tried to help, but our help was not anywhere near as effective as the help that the credit union has given.

"We recall the case of one employee who has worked for us for 30 years. Over these years he was continually harassed by collectors. At least three times we had to extend large advances . . . We were never able to satisfactorily solve his financial problems in all this time. Where we failed, the credit union was completely successful. Now this employee has all his debts paid and a sizable balance in the credit union. He's a different man . . ."

"The savings of our credit union members add up into the ten thousands. We feel that the financial security our men have gained has added to our production. Our experience shows that any company, no matter how small, will find a company credit union one of the best things it can do for better personnel relations and morale building."

The same story goes for Bastian-Blessing Company, manufacturers of soda fountain and food service equipment, controls for liquefied petroleum gas, welding and cutting equipment. President L. G. Blessing reported in '55 to shareholders:

"We authorized the establishment of a credit union at our Chicago plant in October 1952. This has proved extremely beneficial to employees and company. Quite a number of employees were victims of lenders charging 36% annually or more. This resulted in wage assignments, worry to their families. Now the problem has practically disappeared. Workers are happier and contented—and the company has no investment or obligation in the credit union—just supplies personnel."

C. M. Holmes, plant manager of Quaker Oat's Omaha plant, puts it this way: "If employees have money problems, their jobs suffer." He goes on to say that the credit union teaches members to save when they might not save otherwise. It also consolidates their debts at low cost. And the credit committee, made up of fellow employees, acts as a restraint and helps keep members out of further financial difficulties.

BOOSTING MORALE, OUTPUT

John F. Thurston, vice president of Electro Dynamic Division of General Dynamics Corporation (Bayonne, N.J.), says: "Not only does the credit union keep us out of the personnel loan business. It solves employees' financial problems on a much closer, man-to-man basis, than management could do."

The Skil Corporation (Chicago toolmakers) found its retirement profit-sharing plan was causing problems. Some employees who had $1000 or more in the plan and were short of cash wanted to withdraw it. By law they couldn't. Now the credit union grants these older employees low-cost loans. The retirement-fund problem has disappeared.

Personnel Director Dale Doty explains the popularity of Skil's credit union this way: "Employees own and operate it. They learn more this way, even if it's the hard way."

A. Mercolino, industrial labor relations director at Lionel Corporation (Irvington, N.J.), electrical train and toy manufacturers, says: "We feel that harmonious labor relations with our employees and our union representatives would not have been what they are without the assist of our credit union."

Personnel Director Dean L. Garber of Seagrave Corporation (Columbus), manufacturers of fire apparatus, says, "Our reputation in the community as a good place to work is partly due to the standing our credit union has."

A major use of credit union funds is to make loans large enough to consolidate smaller debts. One dramatic example of the benefits to management comes from D. E. Preston, engineer in charge of bonus rates at Union-National, furniture manufacturers (Jamestown, N.Y.), and also credit union president.

"We had one man who was not making a bonus," Preston says, "and I finally asked him the reason. He told me he had so many collectors to worry about that his mind was not on his work. He had 20 different charge accounts. We lent him enough money to pay all bills, and his production rose 40 to 50%."

DEVELOPING LEADERS

Intangible benefit of credit unions pointed out by some survey respondents is development of leaders through training as members of the credit-union administrative group.

J. P. Duffy, manager of industrial relations at Avien Engineering Company (Woodside, N.Y.), says, "The program has developed a group of leaders and given rank-and-file employees good insight into management financial problems."

Crown Cork & Seal Company's Los Angeles plant manager, A. L. Lichtenstein, says: "We are most proud of the people who have organized and handled credit union business. Many of them have gone to school, taking courses that have made them more valuable to us."

W. G. Gates, general manager at Allis-Chalmers Cedar Rapids plant, says the credit union "does an excellent job in helping develop people to carry responsibility and assume places of leadership."

The story's the same at American Cyanamid, according to H. T. Walker, employee relations manager based in New York City: A good part of the credit union's value to the company is "in giving administrative training to employees responsible for its affairs."

CATALOG NEWS

For more about these items, circle numbers on Reader Service Card next to back cover.

MAINTENANCE

1—Power Sweepers. Ten data sheets (in folder) furnish info on power sweepers. Multi-purpose models have time- and gas-saving features, fill requirements for sweeping narrow aisles, crowded areas. Dust control system eliminates sprinkling. *Wilshire Power Sweeper Co.*

2—Cleaning Metal Surfaces. This 4-page brochure (DWL-1806) provides answers to question: "Will repeated use of chemical cleaning damage boilers, heat exchangers, or other process equipment?" Describes chemical cleaning service; gives case studies. *Dowell, Inc.*

3—Ladders. Ladders for working heights up to 15 feet are described in this illustrated 20-page catalog (No. 158). Pyramid design is said to give greater safety for working above floor or ground levels. Shows hydraulic lifts, work platforms. 35 models. *Ballymore Co.*

4—Lift Truck Lubricants. Here's a 27-page Guide (Form 417) that gives detailed info about requirements and selection of lift truck lubricants. Includes refill capacities for crankcases, gear cases, and hydraulic systems; other data. *Kendall Refining Co.*

5—Rotary Tools. This 48-page catalog (F-7) is a rotary tool manual. Is said to offer for first time every type of rotary cutting tool from H. S. steel to carbide, abrasives, and diamond. Tools are indexed by type, size, machine application. *Precise Products Corp.*

6—Lubricating Equipment. Catalog 403 describes grease fittings, Gun-Fil lubricators, interchangeable Gun-Fil valves, drum pump, spray units, and many other accessories. Provides performance data, specifications, and photos. Useful index. *Gray Company, Inc.*

7—Ladders. Here are 40 pages of illustrations and descriptions of ladders, scaffolding, planks. Includes 140 types of wood and metal ladders and several climbing accessories for industrial use. *American Ladder Mfg., Inc.*

8—Welding Equipment. Outfits for general welding, cutting, gouging, and heating are discussed in Catalog No. 6-0332. These 44 pages include info on blowpipes, cutting nozzles and regulators, accessories and supplies. Photos, diagrams. *Linde Air Products Co.*

MATERIALS

9—Acoustical Materials. Two noncombustible materials are described in Bulletin T-487 (4 pages). Has specs for Styltone, a random-fissured mineral wool tile, and Panatone, a perforated metal acoustical panel system; photos of installations. *Baldwin-Hill Co.*

10—Glass Blocks. An illustrated 20-page catalog (AIA File No. 10-F) discusses the uses and installation methods for these glass blocks. Presents advantages of solar-selecting and light-directing designs. Dimensional tables, and other data. *Kimball Glass Co.*

11—Silicones. This 12-page brochure (Code 10-105) outlines properties of silicones as dielectric materials. Discusses use of silicone rubbers, fluids, resins, and compounds in applications from motor insulation to electronic control systems. *Dow Corning Corp.*

12—Resin Curing Systems. Two bulletins, 100-4 and 100-4B, describe studies on dimethylol phenol resins as vulcanizing agents for butyl rubber. Provides helpful data in evaluating curing system for compounds. Cure rates, other info. *Thiokol Chemical Corp.*

13—Plastic Materials. "Condensed Reference File" in 12 pages describes various plastics, including polyethylenes, vinyls, styrenes, phenolics, and epoxies. Gives characteristics and uses. File is thumb-indexed for convenience. Includes many photos. *Bakelite Co.*

MATERIALS HANDLING

14—Conveying Systems. Bulletin GFH-1157 (24 pages) describes suction, pressure, and combination conveying systems for transporting bulk materials. Also covers handling equipment. Provides photos, applications, layouts and other diagrams. *Fluor Products Co.*

15—Trucks. There are over 30 photos of steel-framed two-wheel and platform hand trucks in this 6-page bulletin (T-1-A). Describes construction and applications. Has info on steel casters, nylon-reinforced and vulcanized rubber tire wheels. *The Fairbanks Co.*

16—Stretchers. Here's an 8-page booklet (AD-235) with specifications for strapping tools. Three pages of pictures show how tools can be used on almost any steel strapping application. Continuous take-up, manually operated for light or heavy use. *Acme Steel Co.*

17—Carloader. This 4-pager (ML-657) discusses the subject of streamlining materials handling and de-

OTHER CATALOGS

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Mechanical ..... p. 228
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Building and Materials ..... p. 236
Production ..... p. 238
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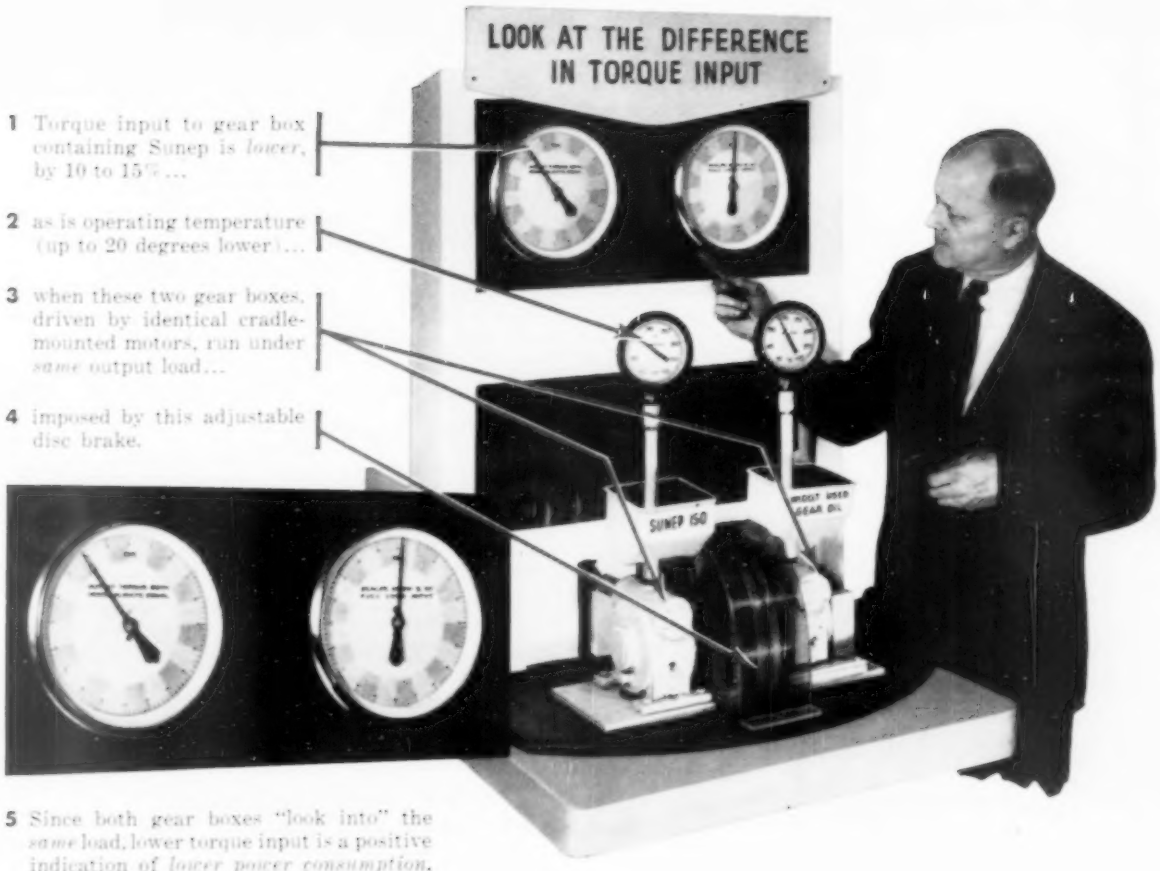

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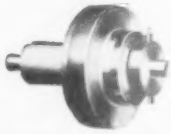

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DODGE
of Mishawaka, Ind.

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scribes the Majik-Loder—which is said to completely load a boxcar in one hour or less. Gives on-the-job photos, adaptability info and specs. *John Morrell Mfg. Co.*

18—Handling Equipment. Conveyors, trucks, skids, lifters, and other handling products are described and illustrated in spiral-bound catalog. Has over 100 pages; useful index shows scope of maker's line. Includes tables of technical data and specs. *The Colson Corp.*

19—Strapping Systems. Illustrated 12-page bulletin (SSS250) shows several tools and machines for strapping all types of containers, packages, bundles. Versatility of tools are described, and 12 separate sheets have suggestions for applications. *The Stanley Works.*

20—Magnesium Hand Trucks. This 4-pager features eight basic models with 26 items of optional equipment. These Pusharound all-purpose two-wheeled trucks meet almost every handling requirement. Includes photos and drawing of basic dimensions. *Brooks & Perkins, Inc.*

21—Trucks. Circular 37 (6 pages) gives operating and maintenance features of electric fork lift truck with capacities from 1000 to 2500 lb. Case history bulletin 397-1 (4-pages) discusses installation of die-handling equipment. *Lewis-Shepard Products, Inc.*

PIPES AND FITTINGS

22—Glass Pipe, Fittings. Catalog SG-11 discusses composition and structure of small-diameter glass pipe. May be used with operating temperatures up to 250 F. without special precautions. Has diagrams of elbows, ties, U-bends, other fittings. *Sentinel Glass Co.*

23—Compensators, Hose. Expansion compensators for steam and hot water lines, both high and low pressures, are covered in Catalog 163 (4-pager). No. 173 (8-pages) describes rubber and synthetic hose, flexible metal hose, fittings, and assemblies. *Flexonics Corp.*

24—Valves. Illustrated catalog (No. 58-59) has 56 pages of data to help in selection and application of valves. Info covers oil and water pressures; graphs, pressure conversion chart, maintenance suggestions. *Barksdale Valves.*

AUXILIARY

25—Heat Transfer Equipment. Bulletin 156 (4 pages) describes heat exchangers, immersion heaters, jet agitators—all made of graphite. Units bear high heat transfer rates, resist attacks by corrosive solutions. Has flow rates, photos. *Heil Process Equipment Corp.*

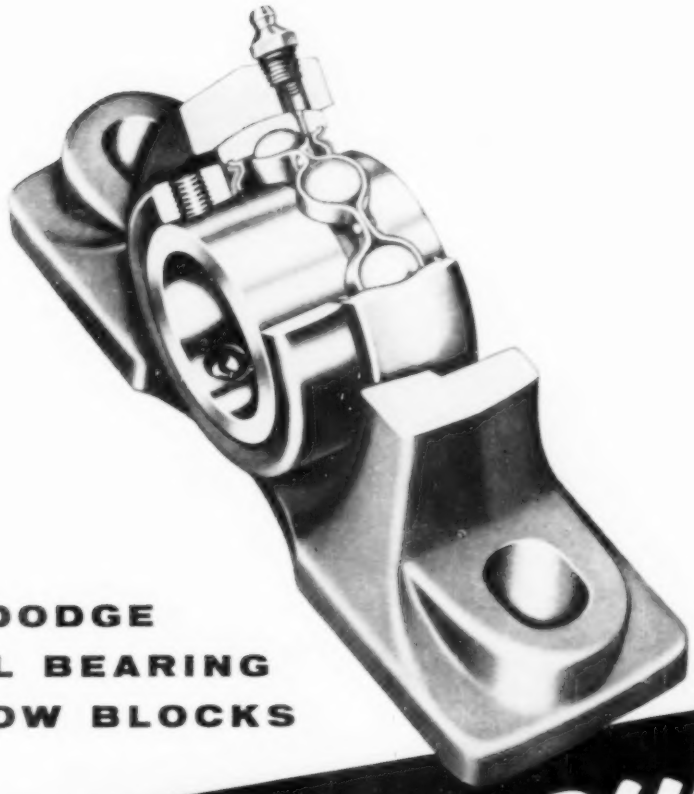
26—Renew-Air Filters. This illustrated 4-pager tells how granules of activated charcoal are placed between sheets of wire mesh to form filter cells. Filter banks are built up from individual cells in various sizes for use in air conditioning systems. *Honeywell.*

27—Compressed Air Processing. "You Benefit By Proper Compressed Air Processing" tells how to make better use of compressed air power. This 4-pager (589) has amusing and helpful illustrations, useful filtration info. *C. A. Norgren Co.*

28—Dust Filter. Specific kinds of dust control in industrial plants are described in 8-page folder (G579). Cutaway view of filter shows working parts and filtering principle. Includes data on design, efficiency, operation of unit. Has specs, photos. *The Day Co.*

29—Pump Motors. These 4 pages describe totally protected pump motors from 1/8 to 1000 hp. Bulletin B-2507 shows hydraulic pump-mount motors, close-coupled and vertical solid shaft motors, P-base and partial motors. *Reliance Electric & Engineering Co.*

Turn to page 228



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SHAFT SIZES — 1/2" to 2-7/16"

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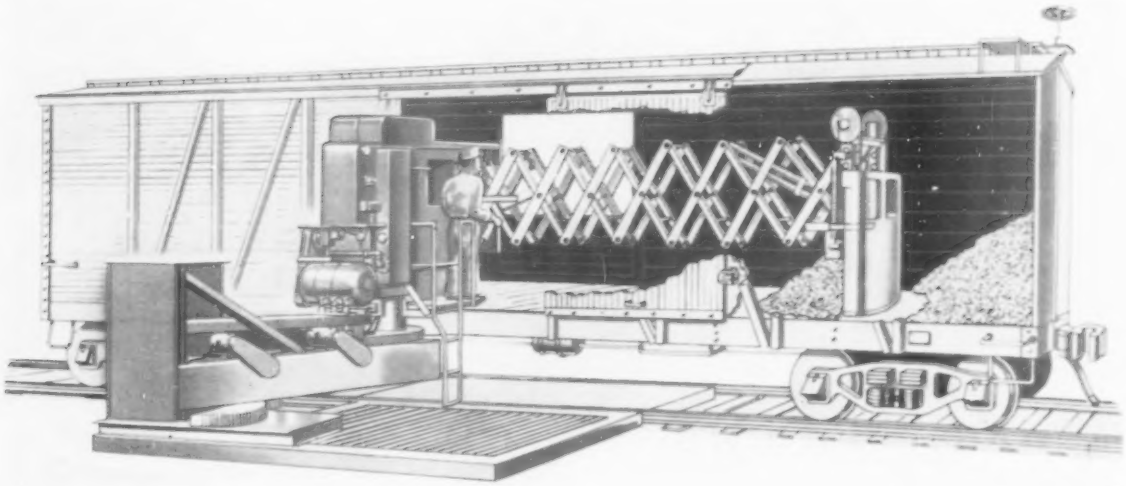

How to Unload a Big Boxcar in 30 Minutes

Materials handling men should swoon at this: a one-man hydraulic-operated unit that can automatically unload any free-flowing material from a large boxcar in 30 minutes —or less—at low cost per ton.

Here's how it works: the hydraulically actuated boom and scoop are swung into the loaded car and the boom extended until scoop meets resistance in the form of material. This resistance causes scoop to dig down into material. Then the boom retracts and pulls the loaded scoop to the open car door for discharge. After discharge, scoop rises automatically and boom extends again to repeat the cycle.

Since operation is fully automatic during much of the unloading, operator has free time to prepare the next car or do other chores.

Stephens-Adamson Mfg. Co. (Circle 101, Reader Service Card.)

102—Remote-Control Batching is possible from the panel in the picture. The panel houses all the controls for operating the system at a point remote from the weighing location. Operator turns knob for proper cut-off weight of each batch ingredient. *Toledo Scale Co.*

103—Electric Fork Truck of 2000-lb. capacity contains the same major components as a gas-powered model of equal capacity—thus simplifies parts inventory for owners of both types. It will travel up to 6½ mph., climb a 10% grade with full load. *Clark Equipment Co.*

104—Walkie-Worklifter unit elevates dies and operator, besides transporting them. The articulated operator's platform is picked up by the load platform as it rises, enabling the handler to work at die level at shelf heights up to 10 ft. *Economy Engineering Co.*

Turn the page

Penetrates through rust
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How much do you spend on removing rust before you paint? Why not coat right over the sound rusted metal with Rust-Oleum 769 Damp-Proof Red Primer after simple scraping and wire-brushing to remove rust scale and loose rust . . . saving time, money, and metal! Rust-Oleum's specially-processed fish oil vehicle penetrates* through rust to bare metal—while the surface film remains *tough, firm,* and *durable.* You cut costly surface preparations, you receive nearly 30% greater coverage depending upon the condition and porosity of the surface—and you receive the *maximum* in over-the-years protection!

Whatever your color choice may be—Rust-Oleum finish coatings include the color you want. They're manufactured under the same *exclusive* formulation as the Rust-Oleum Primer . . . they assure you of *greater* compatibility, *double* protection, and *lasting* beauty! The best way to see what Rust-Oleum will do for you is to actually try it yourself . . . around your plant or home.

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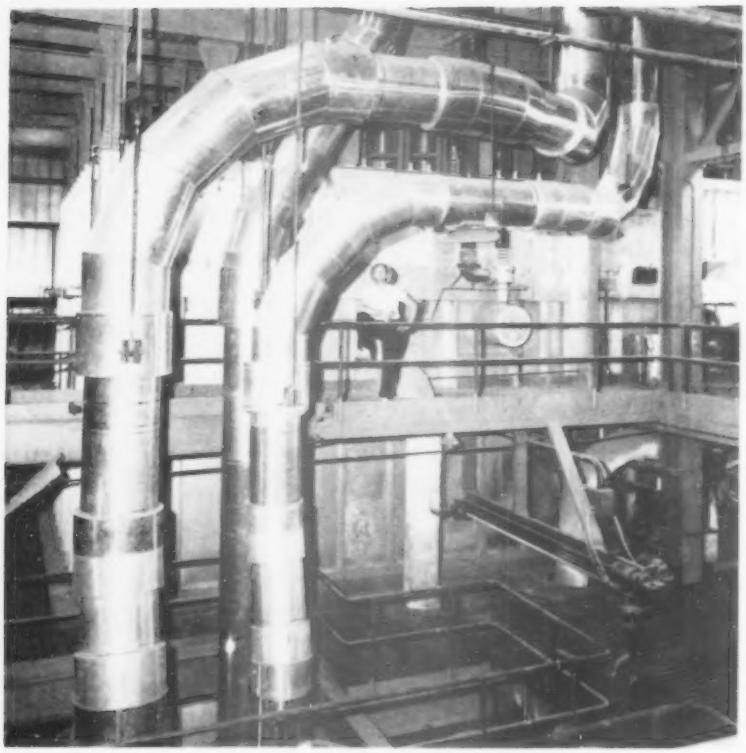


Insulation—"Done With Mirrors"

High-temperature piping gets a new treatment from this prefab insulation that's really "all done with mirrors." New all-metal reflective insulation works like a thermos bottle to minimize heat losses—is basically made up of air spaces, partitioned by reflective metal sheets of aluminum or other high-grade alloys. Technically, it's a kind of "massless" insulation, lightweight and easy to handle.

This wrap-around insulation is offered in prefab units for pipes, fittings, vessels, equipment, boiler casings, and ducts. It can be constructed to handle industrial temperatures from −400 to +2000 F.

Mirror Insulation Co. (Circle 105, Reader Service Card.)

107—Instant Jam Protection Panel takes the place of shear pins and similar forms of protection for conveyors, machine tools, other powered machinery and automation equipment. Operating cycle is a small fraction of a second; and power is automatically locked out until jam is cleared. Pressing a button resets device. *Palmer-Bee Co.*

108—"X-Press" Tapping Tool cold-forms internal threads without cutting in copper, brass, aluminum, and other ductile metals. The thread, formed under pressure, is said to be stronger. And the tap itself is stronger and lasts longer because there are no flutes or cutting edges. No chips, either, to break tap. *Besly-Welles Corp.*

109—Temperature Monitors for controlling temperatures from −400 to +3000 F. come as complete packaged units, ready to connect to thermocouples and power source. Compact boxed unit (1¾x4¼x4¾ in.) contains sensitive meter-relay, 5-amp. load relay, and transformer, rectifier, or other control components. *Assembly Products, Inc.*

110—Port-A-Punch is a pocket-size device for on-the-spot punching of the widely used IBM punched card. It's ideal for inventory records. Speeds data processing and reduces chances of error by eliminating the preliminary writing or typing of source documents. *International Business Machines Corp.*

Turn the page

These Drums Lock Hoops for Tight Packing

Offset rolling hoops on these new 55-gal. steel drums permit tighter packing. The slightly offset hoops, alternately raised and lowered on opposite sides of Uni-Drum, firmly interlock adjacent containers when any number are unitized or packed closely together.

Big advantages are space savings and reduced handling and shipping costs. A unitized group of drums can be handled by a standard lift truck without pallets. And since drums contact each other at their strongest points (rims and hoops), transit damage is minimized.

Uni-Drums cost no more than standard drums, can be mixed with standard drums. And in case you're wondering, they roll straight.

Vulcan Containers, Inc. (Circle 106, Reader Service Card.)

Take hot spray anywhere on the job!

Take the DeVilbiss Portable Paint Heater *anywhere* in the plant. It handles countless paint jobs quickly, cleanly, economically.

DeVilbiss Portable Paint Heater speeds painting, improves coverage . . . cuts waste

Benefit *fully* from the timesaving, money-saving advantages of the hot-spray method. Take it *anywhere* in the plant with the DeVilbiss Portable Paint Heater.

DeVilbiss Hot Spray puts more paint on the surface, with less wasteful overspray. For it thins paint with heat; allows easier atomization with up to 50% reduction in spraying pressure. It's faster, cleaner . . . effects substantial over-all savings.

The heavier coats possible with DeVilbiss Hot Spray give desired film-build with fewer passes over the surface. Improved flowout of heated material produces smoother, more evenly coated surfaces.

Furthermore, it makes paint handle and flow in cold weather as though it were mid-summer. Ask your DeVilbiss supplier about a Portable Paint Heater, today.

Paint hard-to-reach areas faster; cover better with a DeVilbiss P-NU Extension Gun. Has swivel head, adjustable spray pattern.

New DeVilbiss Extension Gun coats hard-to-reach areas

You can save valuable man-hours . . . get better coverage in hard-to-reach areas with a DeVilbiss P-NU Extension Gun.

This complete, easy-to-handle gun coats ceilings, structural steel and other inaccessible places in a jiffy . . . saves time usually wasted in setting up and moving ladders and scaffolds.

Swivel head on the DeVilbiss P-NU Extension Gun permits spraying at any angle, yet adjusts quickly, without tools. And its spray pattern is easily changed from broad fan to narrow round shape.

Your DeVilbiss supplier has the facts on the complete line of paint heaters, spray guns, air compressors, paint pumps and tanks, as well as hose, connections and other accessories. Call him today!

FOR BETTER SERVICE, BUY

DEVILBISS

THE DEVILBISS COMPANY, Toledo 1, Ohio • *Branch offices in principal cities*

For more facts circle 520 on Reader Service Card

HAS THE ANSWER TO YOUR FLEXIBLE TUBING PROBLEMS

It's "Flexineering"—the technical help of Penflex engineers or your specific design, application and installation *plus* the "know how" to supply just the right flexible tubing for your need.

If you want to convey air, water, steam, gases, volatiles; granular, abrasive or light solid materials . . . or require flexible connections that "give" with vibration, expansion, contraction, come to Penflex. Its complete line of bronze, galvanized and stainless steel, corrugated and interlocked tubing is rugged . . . safe at high pressures and temperatures, free from metal fatigue. All types, all sizes in ⅛" to 24" I.D.

GET YOUR COPY

Write Pennsylvania Flexible Metallic Tubing Company, Inc. 7239 Powers Lane, Phila. 42, for "Flexineering" helpful book on tubing.

PENFLEX

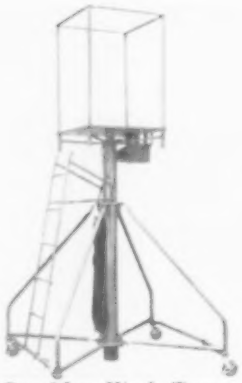
TIGHT AS A PIPE BUT... FLEXIBLE

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

111—"Fire Boss" uses nitrogen-propelled dry chemicals, stored in invertible spheres, to douse big fires. In use, spheres are inverted to working position and the dry chemicals, water, and assisting agents are expelled by compressed nitrogen. Unit may be mounted on truck or skids. *Fire Boss, Inc.*



112—One-Man Work Tower plugs into any 110-volt a-c outlet and permits reaching work up to 23 ft. high. The 30x30-in. platform can be raised to 17 ft. in 25 sec. And the unit quickly telescopes down to clear low, narrow doorways. *Safway Steel Products, Inc.*

113—Hydro-Pneumatic Accumulator, low in initial and replacement cost, is easily installed on any lift truck to eliminate damaging shock to hydraulic parts. Design, with few moving parts, makes it disposable. 1-qt. and 1-gal. sizes. *Greer Hydraulics, Inc.*

Turn the page

NEW CONCEPT OF SAFETY AND STABILITY IN BALLYMORE Safety-Step LADDERS

SECURE FEELING OF WORKERS RESULTS IN BETTER, FASTER WORK

The new pyramid design of BALLYMORE Safety-Step LADDERS offers above-floor working safety never before available. Thirty-five models offer work levels up to fifteen feet.

Write to the Ballymore Company, West Chester 23, Pa., for the new 20-page catalog. Describes complete line of Ballymore equipment for above-floor working safety.

MANY MODELS TO CHOOSE FROM

STEEL OR ALUMINUM

REVOLUTIONARY PYRAMID DESIGN GIVES ADDED SAFETY

PYRAMIDED FOR SAFETY

Three-step, "A" type

Casters provide finger-tip mobility. Rubber-tipped legs lock to floor when in use.

Seven-step, handrails

CHOICE OF WIDTHS 20" or 30" at bottom

CHOICE OF HEIGHTS One to seven steps, steel. One to five steps, aluminum.

BALLYMORE "Hi-boy" SAFETY-STEP LADDERS with BALLYLOCK

Step on the pedal, two legs and non-swiveling rear casters hold ladder firmly in place while in use. Release pedal, ladder rolls easily to location of next job.

Eight-step, work levels up to twelve feet.

TOP PRODUCTION WITH SAFE, CONVENIENT WORK PLATFORMS AND HYDRAULIC LIFTS

Fixed and adjustable-level work platforms and mobile access lifts available in many sizes. Special platforms and lifts designed to fulfill specific requirements.

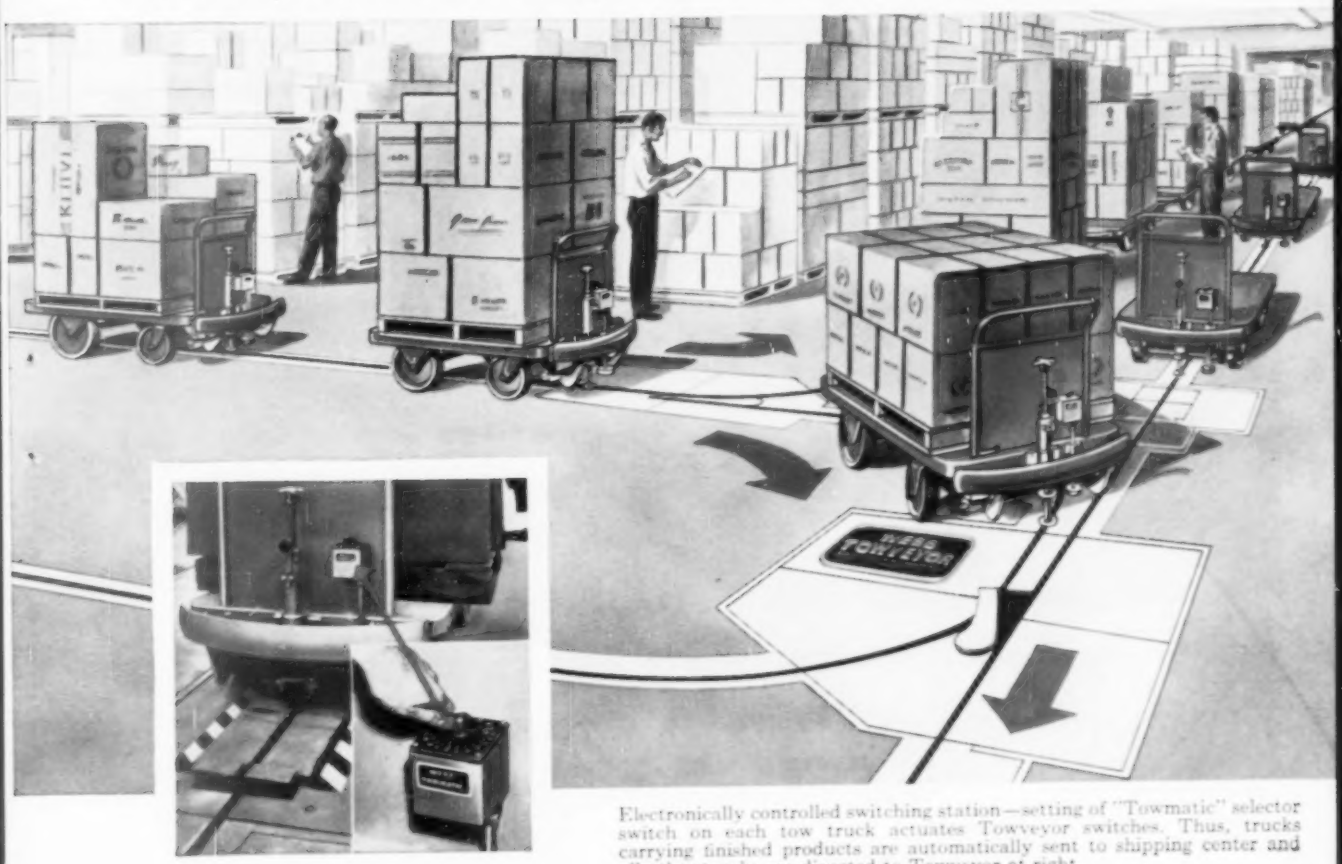
BALLYMORE EQUIPMENT FOR ABOVE-FLOOR WORKING SAFETY

THE STANDARD BY WHICH ABOVE-FLOOR SAFETY IS JUDGED

circle 521 on Reader Service Card

circle 522 on Reader Service Card

FIRST Electronically Controlled Towveyor . . .



Electronically controlled switching station—setting of "Towmatic" selector switch on each tow truck actuates Towveyor switches. Thus, trucks carrying finished products are automatically sent to shipping center and all other trucks are diverted to Towveyor at right.

Slashes Handling Costs . . .
Prevents Traffic Snarls . . . Speeds Production

Johnson & Johnson, in designing their "Plant of Tomorrow", gave major consideration to efficient materials handling. Required was a handling system providing: lower handling costs—smoother traffic flow—increased production—reduced manual handling—integration of materials movement in and between three buildings—automatic delivery of a variety of materials to many locations.

After intensive study of a number of handling methods, J & J selected a Webb electronically controlled Towveyor as their basic materials handling system . . . it filled their requirements.

In fact, all materials handling, in the two manufacturing buildings and shipping, centers around this 3624 foot Towveyor. To provide electronic control for movement of materials, each tow truck is equipped with a 19-station Towmatic selector switch—each station representing a different location in the plant. Thus, by simply flipping Towmatic switch to desired station and lowering tow pin into Towveyor slot, the tow truck is started on its way—electronics take over and materials automatically travel to their destinations.

Two other Towveyors located in shipping center wind through order-picking areas to provide at-hand-convenience for personnel filling customer orders. Towtrucks carrying filled orders are placed on these Towveyors for unescorted travel to loading dock. By automatically performing the multiple materials handling operations required in manufacturing, warehousing and shipping, Towveyors at J & J reduce manual handling—lower operating costs—speed production.

JERVIS B. WEBB COMPANY
SPECIALISTS IN CUSTOM CONVEYOR SYSTEMS
8939 ALPINE AVENUE • DETROIT 4, MICHIGAN

FACTORIES: DETROIT • LOS ANGELES • ATLANTA • HAMILTON, ONT., CANADA • ENGLAND • FRANCE • BELGIUM • AUSTRALIA

For a detailed description of the Johnson & Johnson Towveyor system and its many benefits, write for 12-page Bulletin 28.

Webb in-floor Towveyor and overhead Tow-Conveyor systems are completely described and illustrated in Catalog 157—write for your free copy.

For more facts circle 523 on Reader Service Card

want to cut assembly time . . . increase your production up to 50%? . . . install **NESTIER HOPPER RACKS**

You'll be amazed when you see our actual case studies. They prove beyond a doubt how Nestier Hopper Racks can reduce your assembly time. They eliminate re-handling of parts at work area. They provide a constant supply of readily accessible parts at workers' fingertips and permit rapid replacement of empty units. Nestier Hopper Racks can be filled at a central point thus giving more accurate inventory control.

To find out how Nestier can work for you mail this coupon today.

NESTIER®
FIRST IN SMALL PARTS HANDLING

THEY NEST THEY TIER THEY RACK

NESTIER CORPORATION
Subsidiary of THE METAL SPECIALTY CO.

Nestier Corporation A-4
4519 Este Ave., Cincinnati 32, Ohio

Please send me further information on Nestier small parts handling systems.

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

114—Automatic Dock Ramp, actuated by truck, adjusts to provide firm passage for 10-ton loads. Ramp's movement is always smooth with no "fly-up"; and bumper arms automatically line up with "out-of-square" trucks. Front-of-dock or recessed models. *Rotary Lift Co.*

115—Painting Tool called Pipe-Koter can greatly reduce labor needed for maintenance painting and color coding of pipelines. With an extension tightened into its threaded handle, it will paint both sides of a ceiling-hung pipe from the floor. *Wooster Brush Co.*

116—Bucket Grid that fits into any 5-gal. paint bucket is designed to "fluff up" nap on the paint roller as it crosses grid's surface—thus assuring an even load of paint every time. Grid has channeled metal edges so that it won't tear rollers. *Thomas Products Co.*

Turn the page

Reclaiming old drawings is just one of the jobs you can do with Kodagraph Autopositive Paper

"No more costly retracing for us"

As you can see, the drawing shown above is badly beaten up. Its line detail is weak, its background soiled from old age and considerable handling. And the blueprints and direct-process prints it produces are likely to be illegible.

But, bad as they look, such drawings need not be retraced. Just follow the short cut used by thousands of drafting rooms: Reproduce them on Kodagraph Autopositive Paper . . . or on Autopositive Film, if they look absolutely hopeless.

These Kodak intermediate materials drop out stains and creases . . . strengthen line detail in truly remarkable fashion— give you positive print-making masters directly, without a negative step.

Check with your printroom—or local blueprinter. The cost is only pennies per square foot —a small fraction of the retracing cost.

Kodagraph
Reproduction Materials

FREE: Mail coupon below today for your copy of "New techniques . . . new savings with Kodagraph Reproduction Materials." Jam-packed with valuable tips on saving drafting time, protecting drawings, getting better prints.

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Graphic Reproduction Division, Rochester 4, N. Y.

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Company _____
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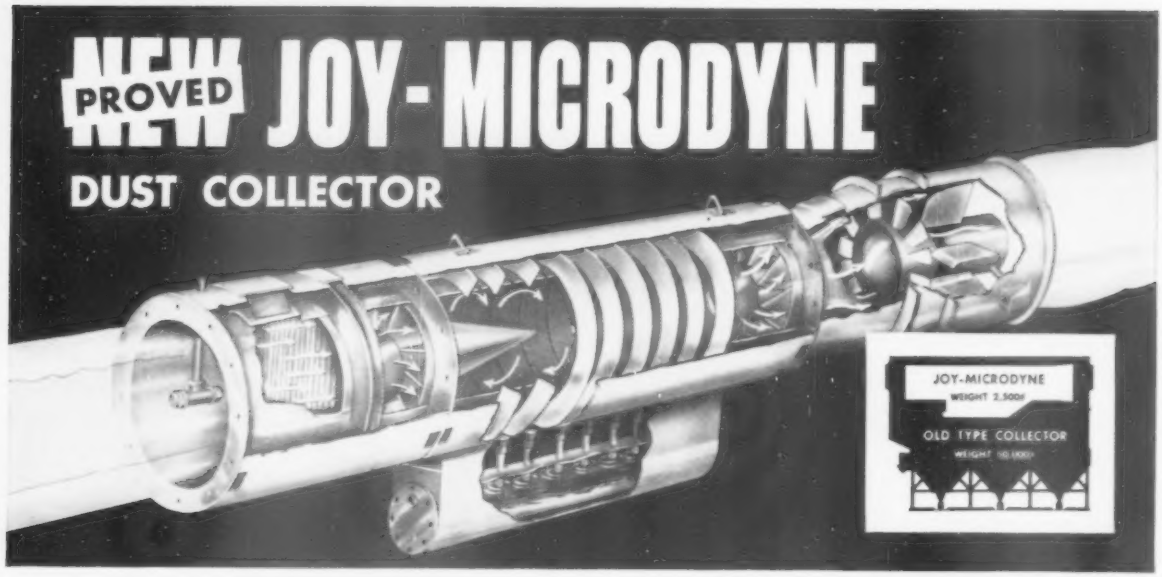
City _____
Zone _____ State _____

Kodak
TRADEMARK

For more facts circle 525 on Reader Service Card



Profile of a Problem Solver

Here is an in-duct "educated pipe" that laughs at space, weight and water limitations as it collects over 99% of dust 5 microns and larger; 92% of 2-micron dust, and substantial amounts of smaller dust.

Particles enter through water-saturated air, slam against a water-film-covered impingement element, encase themselves in water droplets as they pass through, then whirl and collect on the sides of the middle section, to finally drain into a sump. Cleaned air is straightened and thrust on its way by an integral Joy Axivane Fan.

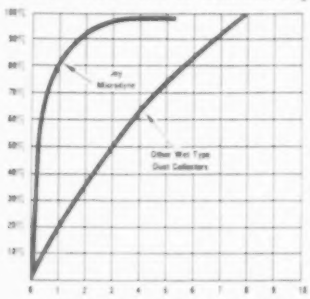
This 48,000 cfm installation shows compact assembly and space economy of in-duct placement.

SAVES SPACE—Installs as an integral section of ductwork; requires only 1/10 to 1/20 the space of conventional units. 2500 cfm unit is 10 feet long; 1.5 feet in diameter.

SAVES WEIGHT—Even the largest unit—64,000 cfm, 5 feet in diameter, 32 feet long—weighs only 6,500 pounds . . . or 1/5 the weight of conventional collectors. 2,500 cfm unit weighs only 325 pounds.

SAVES WATER—The largest Joy collector requires only 48 GPM flow—much less than comparable wet collectors. Add a Delpark Filter (Sold by Joy) and water can be recirculated to recover valuable dusts. The filter also reduces water borne solids to give a dependable, clear water supply from a dirty water source.

SUCCESSFUL INSTALLATIONS—Joy collectors from 500 cfm through 64,000 cfm are *now in use* collecting such widely varied dusts as hemitite, copper and uranium ores, coal, quartz, limestone, phosphate, stainless steel and titanium carbide grindings. For answer to your dust collecting problems, write, wire or call: ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** *In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

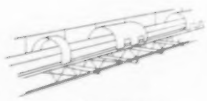


Performance graph of actual installation shows efficiency of the Joy-Microdyne Dust Collector. (A micron is 1/25,000 inch)

WSW I 7002-231

WRITE FOR FREE BULLETIN 231- 12

JOY . . . EQUIPMENT FOR INDUSTRIAL PLANTS . . . FOR ALL INDUSTRY

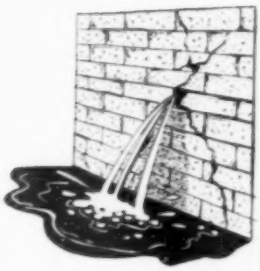


Conveyors

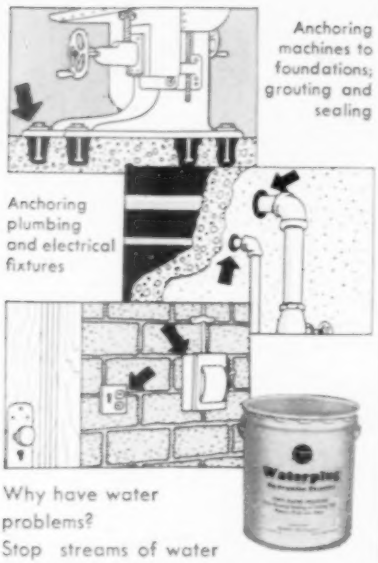
Industrial Compressors

Electrical Connectors

Fans and Blowers



Maintenance and Rehabilitation of Masonry



Why have water problems?
Stop streams of water ***instantly*** with

WATER PLUG

Keep water out of the wall with THOROSEAL

THOROSEAL

SAVES THE SURFACE, KEEPS OUT DAMPNESS AND MILDEW

WRITE FOR FREE LITERATURE "HOW TO DO IT"

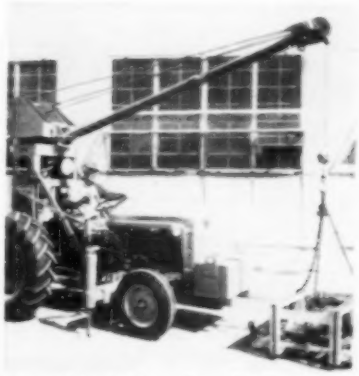
STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PA. • CENTERVILLE, IND.

circle 527 on Reader Service Card

FACTORY / EQUIPMENT NEWS
Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

117—Lift Truck Attachment permits carrying and stacking five 55-gal. drums at one time. Fastens directly on fork carriage of any of maker's gas or electric powered lift trucks. Drums nest on six rams that are welded onto a 130-in.-wide plate. *Yale & Towne Mfg. Co.*



118—Yard Handling Unit, bolted onto chassis of wheel- or track-type tractors, can lift 5000 lb. Boom is 12 to 16 ft. long, swings 280 deg.; can be lengthened by adjustable guy lines for precise load spotting. Hydraulic outriggers retract for travel. *Anthony Co.*

119—Outdoor Lighting Fixture that's shatter-resistant defeats vandalism. The lightweight unit features a Plexiglas diffusing globe, topped by an aluminum reflector. It's designed to use incandescent, fluorescent, or mercury vapor lamps. *Silvray Lighting, Inc.*

Turn the page

TAPPING SCREWS
MACHINE SCREWS & NUTS
DRIVE SCREWS STOVE BOLTS
CARRIAGE BOLTS WOOD SCREWS
DOWEL SCREWS HANGER BOLTS

IN FASTENERS SOUTHERN IS

quality

If quality is an important element in your assembly operations, it will pay you to see how Southern Screw's Quality and Service has worked wonders for many industries. Southern Screws can do the same for you.

There are no better fasteners than USA-made Southern Screws. Over a billion in stock, available from our warehouses in New York, Chicago, Dallas and Los Angeles . . . Let us quote Southern *quality* screw prices on your requirements. Compare with the cost of conventional screws. Address: Southern Screw Company, P. O. Box 1360, Statesville, N.C.

Southern SCREW COMPANY
STATESVILLE • NORTH CAROLINA

circle 528 on Reader Service Card

Yes, that's a strong promise. But it's being done right now in plants like yours. Here's how:

Match the requirement of your job with a custom-built Reading crane at no extra cost

Imagine, at what you'd normally pay for an "ordinary" crane, you can actually have one "tailor-made" for your own plant. For when you order a READING CRANE, our engineers offer you a choice of several interchangeable motor, trolley and hoisting units.

Known as UNIT CRANE DESIGN, this unique construction method assures greater operating efficiency. It enables you to move more materials at the lowest possible cost. And it helps you reduce maintenance time and save maintenance dollars—any unit can be removed for overhauling or repair without dismantling any other unit!

READING CRANE & HOIST CORPORATION 2104 Adams St., Reading, Pa.

READING CRANES

CHAIN HOISTS | OVERHEAD TRAVELING CRANES | ELECTRIC HOISTS

For more facts circle 529 on Reader Service Card

FACTORY / EQUIPMENT NEWS

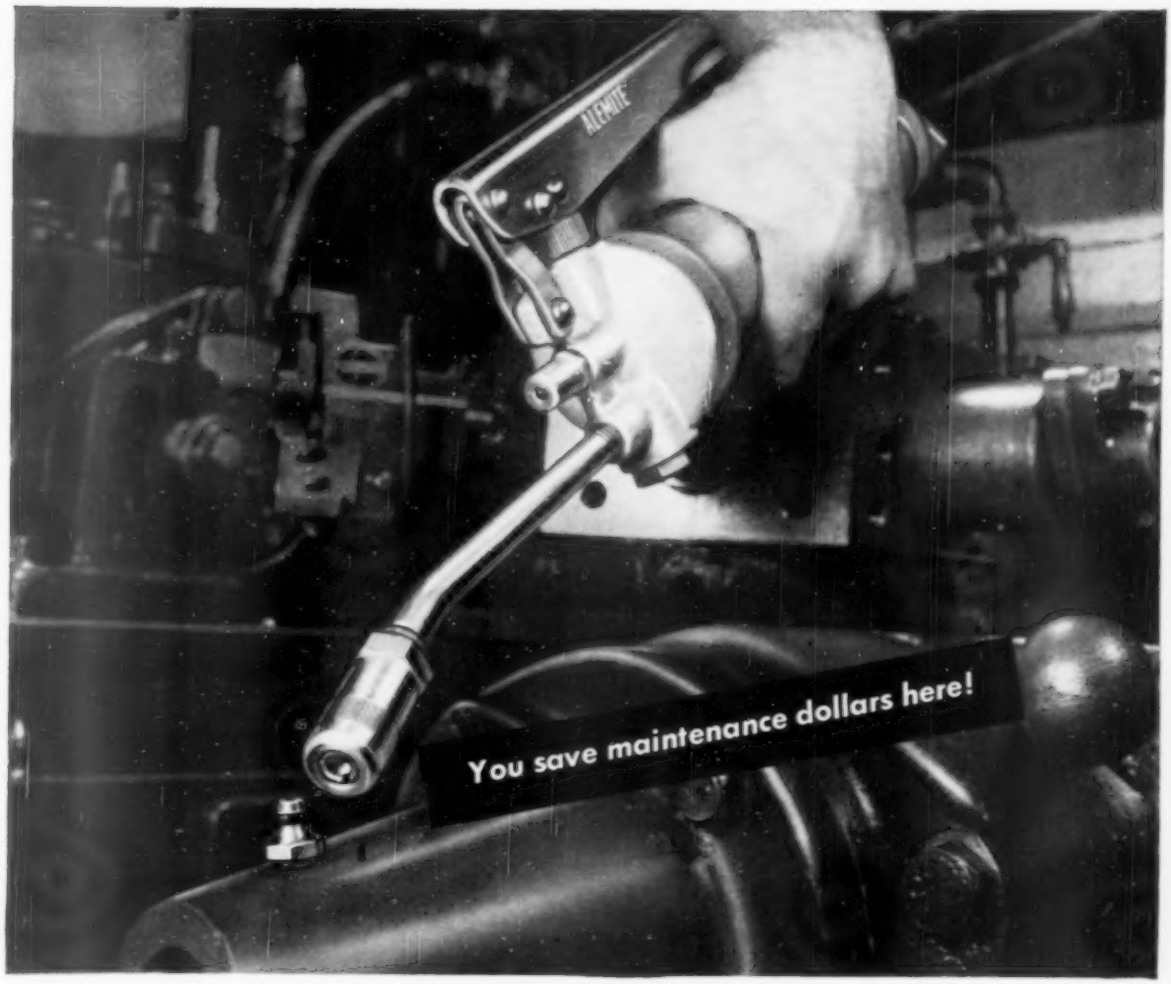
Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

120—"Foamite ST" Unit, employing a protein stabilizer charge, produces fire-killing chemical foam that resists water discharged from overhead sprinklers. Eliminates need for water deflection canopies where dip and quench tanks are used. *American LaFrance Corp.*

121—Silicon Chargers handle 12-volt electric truck batteries with capacities up to 660 amp.-hr. Charger can be mounted on top of a 6-cell battery, or wall-mounted and plugged into any 60-cycle, single-phase, 15-amp., 115-volt a-c outlet. *C&D Batteries, Inc.*

Turn the page



Alemite Hand Guns and Fittings Give You Up to 10,000 lbs. of Lubrication Power!

The point of lubrication is where maintenance costs can be cut—providing you have the right equipment for the job!

This heavy-duty Alemite hand gun—combined with genuine Alemite lubrication fittings—brings up to 10,000 lbs. of pressure to even ordinary lubrication points. It gives you power to spare for fast, efficient, money-saving protection of every machine in your plant!

Gun handles all regular pressure gun greases. Long operating handle for maximum leverage. Loader fitting permits fast, clean filling (or gun may be filled by suction). Heavy steel linkage for true piston alignment. Capacity, 1 lb. Get more out of man-hours and machine-hours with Alemite lubrication equipment!

Symbol of SW Excellence

ALEMITE
DIVISION
STEWART-WARNER
CORPORATION

1850 Diversey Parkway, Chicago 14, Illinois

MAIL COUPON FOR COMPLETE INFORMATION

ALEMITE, Dept. E-48
1850 Diversey Parkway, Chicago 14, Illinois

Please send me free your complete catalog of Alemite industrial lubrication equipment

Name _____

Company _____

City _____ State _____

For more facts circle 530 on Reader Service Card

For
BETTER CONTROL of FLUIDS
Specify
Norgren
CONTROL VALVES

DIAPHRAGM TYPE VALVES

Automatically protect **against damage from excessive pressure build-up. Provide controlled operation for fluid recirculating systems.**

Easily adjusted **to relieve at desired pressure. Relief settings: 0-15 psi, 0-50 psi, 0-75 psi, 0-125 psi, 0-250 psi for pipe sizes ⅛" through ½", and 0-15 psi, 0-50 psi, 0-75 psi, 0-125 psi for ¾" and 1" pipe sizes.**

POP SAFETY VALVES

Prevent the build-up of dangerous, excessive pressures in air tanks. Valve automatically pops open at desired setting. Pipe sizes ⅛", ¼", ⅜" and ½".

LOW FLOW RELIEF VALVES

Small, inexpensive valves suited for a wide variety of uses requiring relief at low rates of flow. ⅛" and ¼" pipe sizes.

FLOW CONTROL VALVES,
Two-Way — Single-Way

For accurate control of air and hydraulic cylinders. Provide large volume flow with low pressure drop, easily and quickly regulated. ¼", ⅜" and ½" pipe sizes.

NEEDLE VALVES

Tapered needle provides controlled metering of air, liquids and gases that do not affect brass. Leakproof. Choice of five types in ⅛" and ¼" pipe sizes.

For complete information, call your nearby Norgren Representative listed in your telephone directory . . . or

• WRITE THE FACTORY FOR NO. 900 CATALOG

C. A. NORGREN CO.

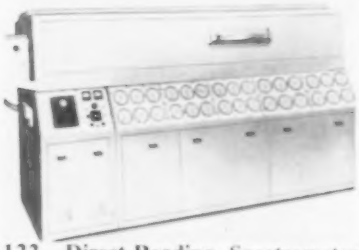
If it's Norgren . . . It's Dependable.

3421 SO. ELATI STREET • ENGLEWOOD, COLO.

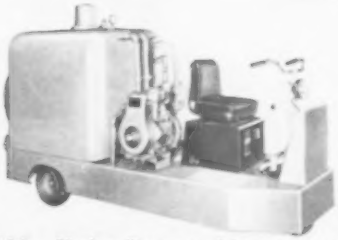
FACTORY / EQUIPMENT NEWS

Begins on page 140

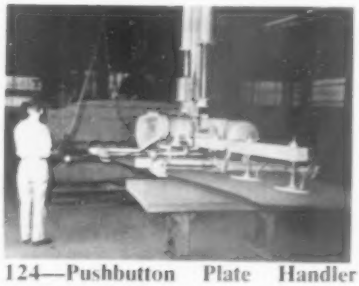
For more about these items, circle item numbers on Reader Service Card next to back cover.



122—Direct-Reading Spectrometer called "Atomcounter" provides fast on-the-spot analysis of production metals—analyzes metals and alloys for 30 elements in 30 seconds. Features control of all operations, easily serviced plug-in components. *Jarrell-Ash Co.*



123—Sludge-Vac machine collects sludge, chips, and waste oil from machine tool sumps and settling tanks, transports it to disposal area, and discharges it under pressure. Unit also quickly services drip-pans, dust collectors. $5000. *Gorske Industrial Equipment.*

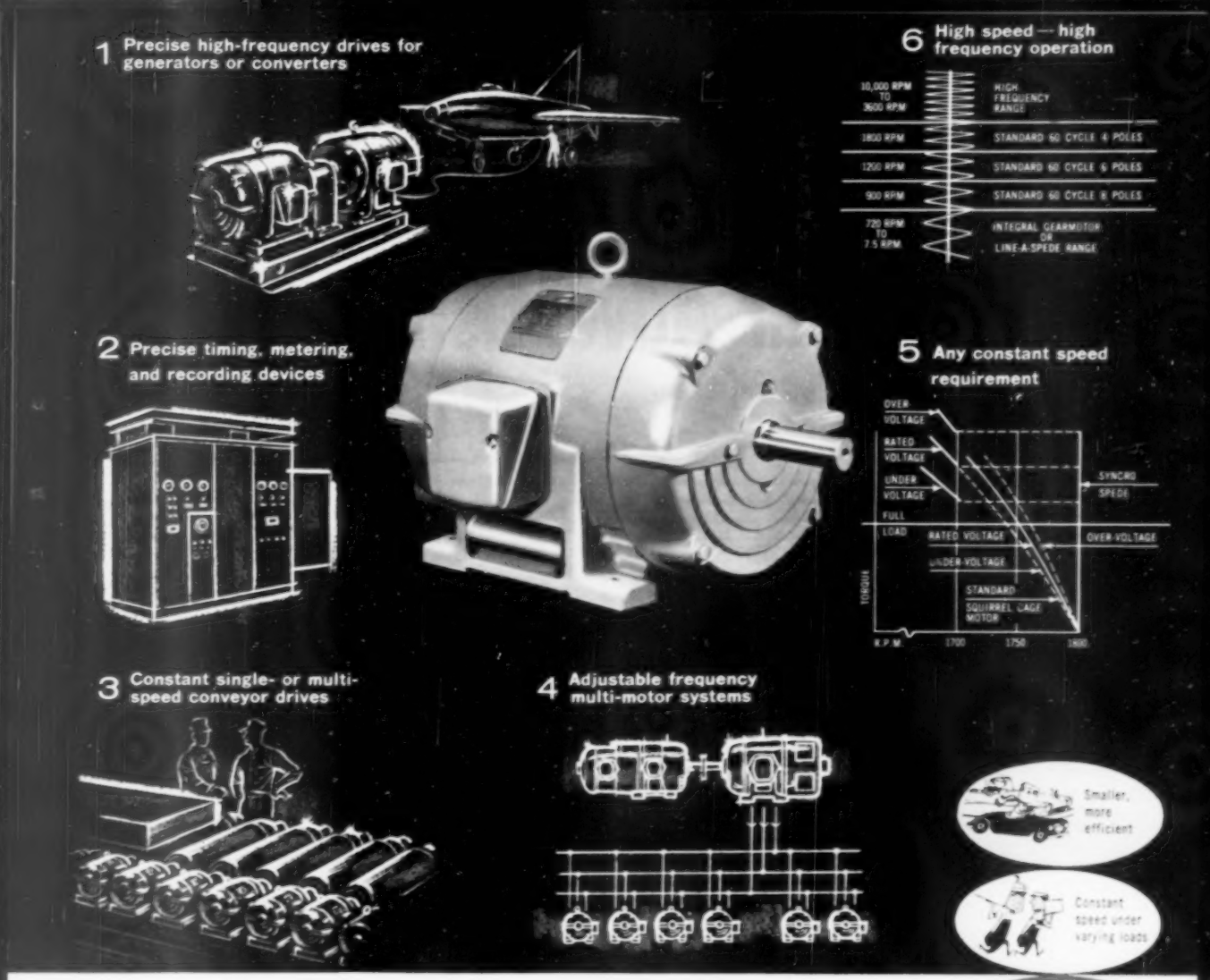


124—Pushbutton Plate Handler can be quickly attached to cab or floor-operated overhead cranes and operated by one man. The plate can be picked up or set down flat on pile or floor without blocking. Standard lift capacities range from 1000 to 4000 lb. *Noble Co.*

Turn to page 158

For more facts circle 531 on Reader Service Card

For more facts circle 532 on Reader Service Card ➤



The Louis Allis Syncro-Spede

a synchronous motor built in the same NEMA frames as standard motors of equal horsepower!

It's compact, simple, versatile . . . and trouble-free!

The remarkable Louis Allis Syncro-Spede® Motor enables you to provide exact synchronous speed for *any* application for less cost — with fewer controls — and in less space than previously possible.

If your equipment or operation calls for precise constant speed, check the advantages this new motor offers you:

Space-saving design — The revolutionary Syncro-Spede needs no external excitation, wound rotating fields, collector rings or brushes. It's built in the same standard NEMA frames as ordinary induction motors of equal horsepower. It requires less space — is virtually maintenance-free.

Wide range of enclosures — The Syncro-Spede can be provided in a wide variety of enclosures to meet special operating requirements. For example, Syncro-Spede is readily available in totally-enclosed fan-cooled and explosion proof enclosures — thus permitting installations which were difficult to make with D.C. excited synchronous motors.

Unmatched versatility — Syncro-Spede is available in standard sizes up to 100 hp, and even larger ratings for special applications. It can also be furnished in a wide range of mechanical modifications . . . base- or flange-mounted—as a gearmotor or brakemotor—even as a rolled-shell shaftless motor for "built-in" applications.

For full particulars and expert application engineering help, contact your local Louis Allis District Office. Or write for Bulletin No. 1900 to The Louis Allis Co., 432 East Stewart Street, Milwaukee 1, Wisconsin.

LOUIS ALLIS

LA-143

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

The Year Advertising Helped

This editorial message was first published by McGraw-Hill two years ago. It describes advertising's dramatic contribution to the American economy during 1954. The theme of the editorial—that advertising can help promote economic stability by stimulating sales at a crucial time—is even more pertinent today.

As our economy grows, it is constantly changing. The conditions business faces today are not the same in every respect as those it faced in 1954. But business again has the opportunity, through advertising and other selling efforts, to help sustain a high level of economic activity. At the same time, it will be building markets for the period of renewed expansion that is sure to follow.

This editorial is reprinted exactly as it appeared in 1956 except for minor editorial changes to bring it up to date. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C McGraw

PRESIDENT

McGraw-Hill Publishing Company, Inc.

IN 1954 we had a business recession in the United States. Sales fell about 4% during the year. If management had followed the historic pattern of business ups and downs, advertising volume would have fallen much further.

But in 1954 the volume of advertising did not fall. It increased over 5%, and expenditures in all major advertising media rose. Every effort was made to stimulate sales when sales were needed to sustain prosperity.

This was something entirely new under the sun. It had a powerful influence in making the recession of 1953-54 one of the mildest on record. It helped greatly to speed business on to the record-breaking levels it attained in the years 1955-57.

There are several reasons why America's business management attacked this decline in sales with more advertising. One of them grew out of the greatly strengthened position of the American consuming market. Consumers' income after taxes has been rising an average of over $10 billion a year since 1946, and this rising income is more widely distributed than ever before. Furthermore, consumers had piled up reserves of about $200 billion in cash or its equivalent. These reserves offered a new and powerful inducement to increased selling and advertising effort even in the face of a possible decline in consumer income. (At the end of 1957, consumer reserves were $225 billion.)

Taking the Longer View

However, the principal reason why a sales decline was attacked with increased advertising is management's new-found conviction that good advertising is essentially an investment in the development of a market. Successful development requires sustained investment. The inclination of business management to take this longer view is, of course, motivated

McGraw-Hill PUBLISHING COMPANY,

ABP HEADQUARTERS FOR

Kill a Business Recession

by the fact that the American market, with over 3 million consumers being added annually, is growing at a prodigious rate.

Ten years ago only a handful of companies had plans for investment in new producing facilities extending beyond the current year. Today almost all leading companies have investment programs running some years ahead. And keeping pace with these long-range investment plans has been the development of sales and advertising programs to reach tomorrow's greatly expanded markets.

Advertising's Key Role

This crucial role of advertising in providing driving power for our economy is gaining greater recognition every day. In his book, "People of Plenty," Professor David M. Potter of Yale University remarked: "Advertising is not badly needed in an economy of scarcity, because total demand is usually equal to or in excess of total supply, and every producer can normally sell as much as he produces. It is when potential supply outstrips demand—that is, when abundance prevails—that advertising begins to fulfill a really essential economic function."

Today abundance so completely prevails in the United States that it has been conservatively estimated that as much as a third of everything offered for sale falls in the realm of "optional consumption." That is, consumers can "take it or leave it" without any immediate personal inconvenience. But if they decide to "leave it," a terrific economic depression will not be far behind. In such circumstances, advertising—in which, in all of its forms, we are now investing over $10 billion annually—clearly is of crucial importance to our continued prosperity.

In performing its key role in past years, American advertising never realized its full potential. It successfully promoted sales. But it never was called upon to promote an overall economic stability as a direct outgrowth of increased sales.

By successfully promoting both sales and economic stability, as it did in 1954, advertising surely has added new strength to the American economy. It has also added a great new and constructive dimension to advertising itself.

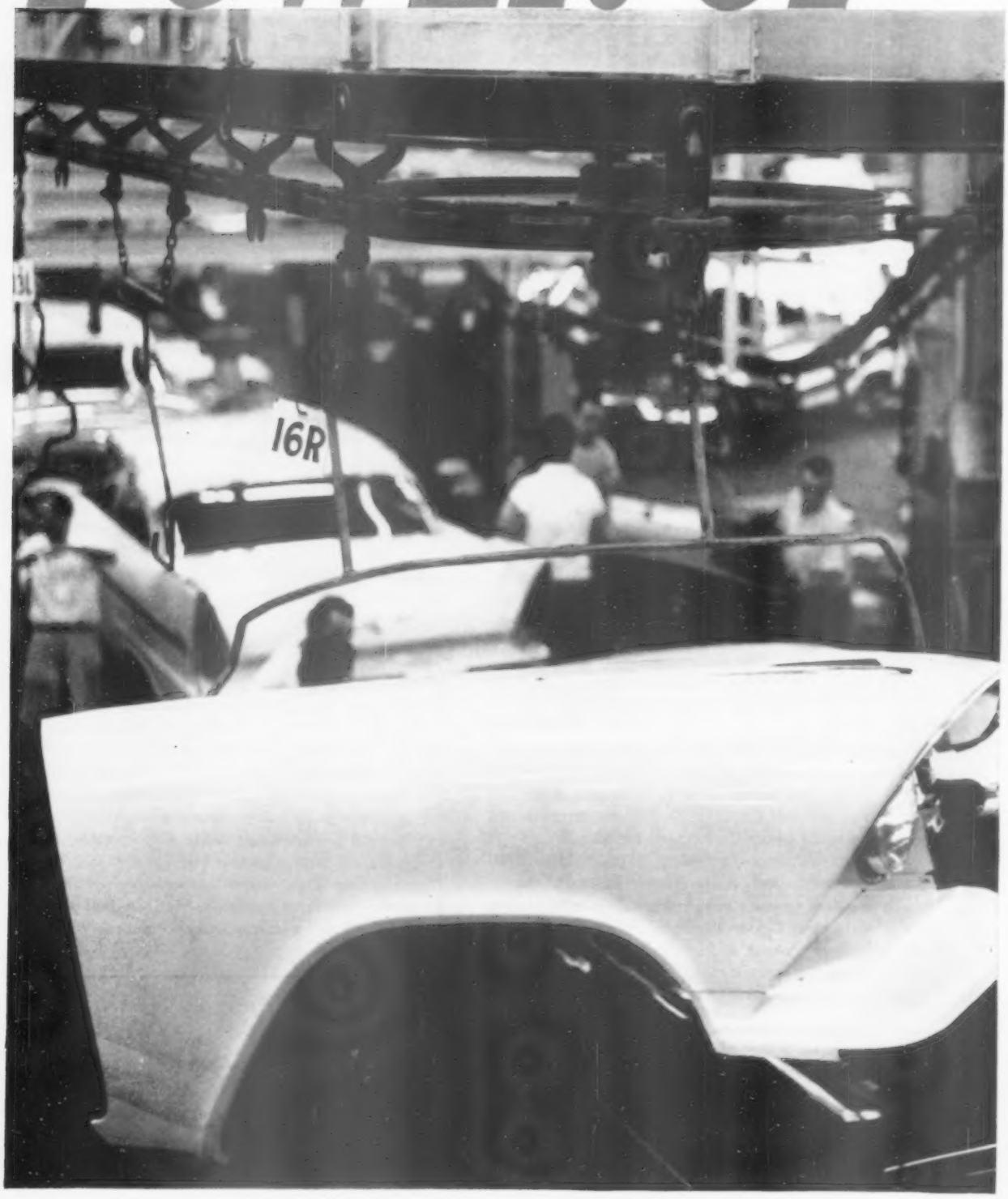
One of the surest means of expanding your sales volume in today's industrial markets is through dominant advertising in the publications directly serving your major customers and prospects.

McGraw-Hill's business and technical publications can give you quick access to the men who initiate, specify and approve the purchases of industrial products and services. Because all are leaders in their respective fields, you are assured a maximum return on your advertising investment when you *concentrate* in the McGraw-Hill publications serving your most important markets.

INCORPORATED • 330 West 42nd St., New York 36, N. Y.

B U S I N E S S I N F O R M A T I O N

POWER-UP



Chrysler Corporation did . . . and synchronized production flow for modern, car-a-minute assembly

Today, forward-looking uses of electric power and static electrical control are helping reach a long-sought goal of synchronized, modern assembly at the Plymouth plant in Newark, Delaware. Chrysler Corporation benefits include: improved handling procedure, more accurate scheduling and simplified maintenance.

Two and one-half miles of floor conveyor and over five miles of overhead monorail conveyor are automatically synchronized for exact match-up of body parts. Transfer from one conveyor to another is completely automatic at hundreds of transfer points.

Pushbutton sorting, storing and transfer of auto body shells is provided by Cypak* control systems at several large storage conveyor banks.

Electrical planning has provided for fast, efficient trouble-shooting. Cascade-type control interlocking of conveyor drives automatically starts and stops conveyor in sequence.

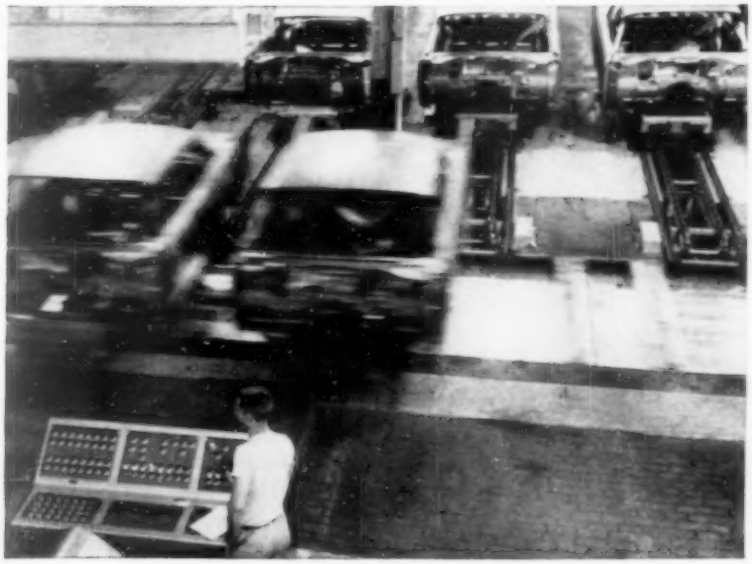
Your Westinghouse and electric utility representatives are helping many plants POWER-UP . . . Why not ask for experienced help to get better production and more profit from your electrical dollar?

*Trade-Mark

J-97227

YOU CAN BE SURE...IF IT'S Westinghouse

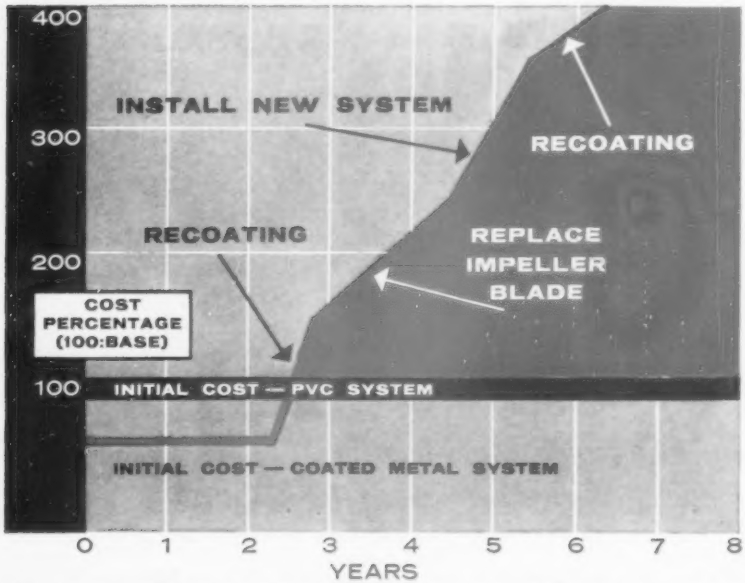
Westinghouse AV Drive cabinets group the adjustable voltage d-c power and regulator systems for each conveyor. Magamp* automatic speed and position control regulates conveyor travel to bring ivory fenders to the ivory body shell on time.
*Trade-Mark



Pushbutton selection of stored auto bodies depends upon Cypak static control for automatic follow-through at each transfer point. Cypak was selected for this complex job to greatly reduce maintenance and size of control circuitry.

For more facts circle 533 on Reader Service Card

SAVE UP TO 300% ON CORROSIVE FUME REMOVAL COSTS . . .



Fans, Blowers, Hoods and Ducts by Industrial Plastic Fabricators Eliminate Maintenance & Down Time

A major chemical manufacturer compared an IPF Polyvinyl Chloride exhaust system with a metal coated system under similar conditions over a period of 8 years. The result — savings up to 300% with IPF Polyvinyl Chloride (PVC) exhaust system. With conventional equipment you never stop paying for protection against corrosion through repeated paintings and coatings, costly replacements, lost production time and interruptions of critical processes.

Now you can triple the life of your exhaust systems with IPF PVC Blowers, Fans, Hoods and Ducts.

- Resists most corrosive fumes and combinations of fumes.
- Constructed of smooth non-porous plastic — never requires repainting or recoating.
- Extremely strong and lightweight — easy to install or relocate.
- Non-sparking and non-combustible — handles flammable fumes.

For complete details on PVC blowers, fans, tanks, hoods and stacks — write for descriptive literature.

ipf industrial plastic fabricators, inc.
NORWOOD, MASS. NOrwood 7-3411

REPRESENTATIVES THROUGHOUT THE UNITED STATES

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

125—Pipe Insulation of fine glass fibers has full-length "hinge action" for easy installation on pipelines. Temperature range from below zero to 350 F.; comes in wall thicknesses and ID's to fit standard iron pipe and copper tubing. *L.O.F. Glass Fibers Co.*

126—Magnetic Parts Conveyor will carry small processed metal parts —like those from a nail heading machine or punch press—at a 45-deg. incline. And will elevate the parts for discharge into a hopper, shipping container or another conveyor. *Rapids-Standard Co.*

127—Pyramided Ladders, in 8- to 12-step models, are 30 in. wide at bottom, tapering to 25½ in. at top step. All models are equipped with handrails, 4-in.-dia. casters, and foot-operated lock. Treads of anti-skid grating or ribbed rubber are available. *Ballymore Co.*

Turn the page

For more facts circle 534 on Reader Service Card

Man and boy at right dramatize size of this 80' x 360' Stran-Steel building owned by West Jersey Warehouses, Inc., of Bridgeton, N.J. Here is 28,800 square feet of working space.

MASS-PRODUCED FOR SAVINGS... CUSTOM-FITTED TO YOUR NEEDS!

In your next building—factory, warehouse, or retail outlet—get these three big benefits: 100% useable clear-span interior, firesafe all-steel construction and a 5-year payment plan. They're all yours with a Stran-Steel Rigid Frame building!

Wide-Open Interiors Fit Any Floor Plan

The Stran-Steel method of construction means you get top design flexibility. Mass-produced components give you major economies and, at the same time, permit you to tailor your building to the size, function and appearance you specify. Insulates easily, takes cranes or monorails, combines effectively with other materials—like brick, masonry, wood and glass. And Stran-Steel's precision pre-engineering means your site-assembled building goes up in days, stays up for decades with minimum upkeep and operating expense.

Only One-Fourth Down as Your Initial Investment

Without affecting your regular credit lines, you can buy this versatile, durable building through the Stran-Steel Purchase Plan. Pay as little as one-fourth down for the completed structure—including foundation, erection cost and tax—with as long as five years for the balance. Your building works for you as you pay. Mail the coupon now for more information or call your Stran-Steel dealer. He's listed in the Yellow Pages under *Steel Buildings* or *Buildings—Steel.*

Good-looking, hard-working manufacturing plant for Standard Fence Co., Manchester, N.H. Stran-Steel factories can be expanded easily when you need more production space.

Dept. 28-19

STRAN-STEEL CORPORATION

Detroit 29, Michigan • Division of

NATIONAL STEEL CORPORATION

Stran-Steel Corporation, Dept. 28-19
Detroit 29, Michigan

Please send me the Industrial Buildings Catalog.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

For more facts circle 535 on Reader Service Card

TRADE ARRO MARK

MACHINE SCREW ANCHORS

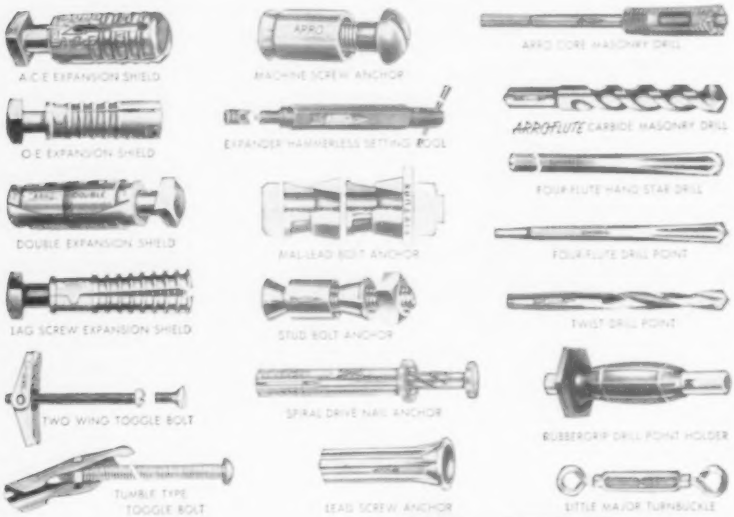
Easy to install . . . requires shallow hole . . . fixture can be removed and replaced without loosening anchor . . . a few hammer blows set anchor firmly . . . conical-shape nut expands lead sleeve to provide strong holding power . . . widely used by electricians, plumbers, carpenters, ornamental iron workers, maintenance men, awning and sign men and other tradesmen.

Cutaway drawings show how setting tool expands lead sleeve around conical nut.

HAMMERLESS SETTING TOOL

Expander hammerless setting tool for easy installation of Arro Machine Screw Anchors in hollow tile, bottomless or weak-bottom holes.

THE ARRO LINE OF MASONRY ANCHORING AND DRILLING DEVICES



See your industrial, hardware or electrical supplier

TRADE ARRO MARK

ARRO EXPANSION BOLT COMPANY
DEPARTMENT E, P.O. BOX 388, MARION, OHIO

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

128—Maintenance Lapping Machine with 10-in.-dia. lap plate will consistently reface mechanical seals, valve seats, compressor disks, fuel injector parts, and other parts to a precision flatness of 0.0000116 in. and with micro-finishes of 2 to 3 RMS. *Crane Packing Co.*

129—Machine Tool Test Kit lets you spot-test various mixtures of coolants on-the-job without draining and refilling the entire machine system. All necessary test equipment, dilution chart, and cutting fluids come in compact canvas case. *Philip M. Stinson, Inc.*

130—Air-Powered Indexing Table with 14-in.-dia. turntable will index to 4, 6, or 12 stations. Motive power is applied to rim of turntable, insuring steady movement and power. Table remains locked except when actually moving to next station. *Mead Specialties Co.*

Turn the page

For more facts circle 536 on Reader Service Card

For more facts circle 537 on Reader Service Card ➤

Photo courtesy of Economics Laboratories, Inc.

After you buy a Clark truck . . . what then?

Almost more important than your original truck purchase is the service you get *after* delivery. Quality of the truck is taken for granted. What you're interested in is *keeping* the equipment on the job and keeping maintenance costs down. It's why competent local service is so important.

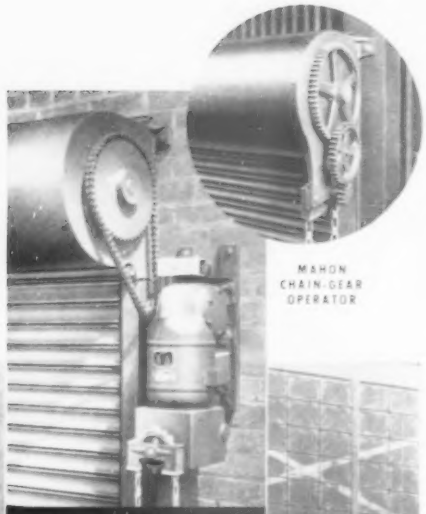
If you are already a Clark user, you know the service your local Clark dealer supplies is fast, dependable and economical. You know, too, that his service extends to such things as improving equipment utilization, safety programs for your employees, and a number of other services designed for your specific benefit. If you would like *full* details on the many special aids available, write to: Local Service, Clark Equipment Co., Battle Creek, Michigan.

CLARK® EQUIPMENT

Printed in U. S. A.

Rolling Steel Doors

for Truck and Railroad Openings



MAHON CHAIN-GEAR OPERATOR

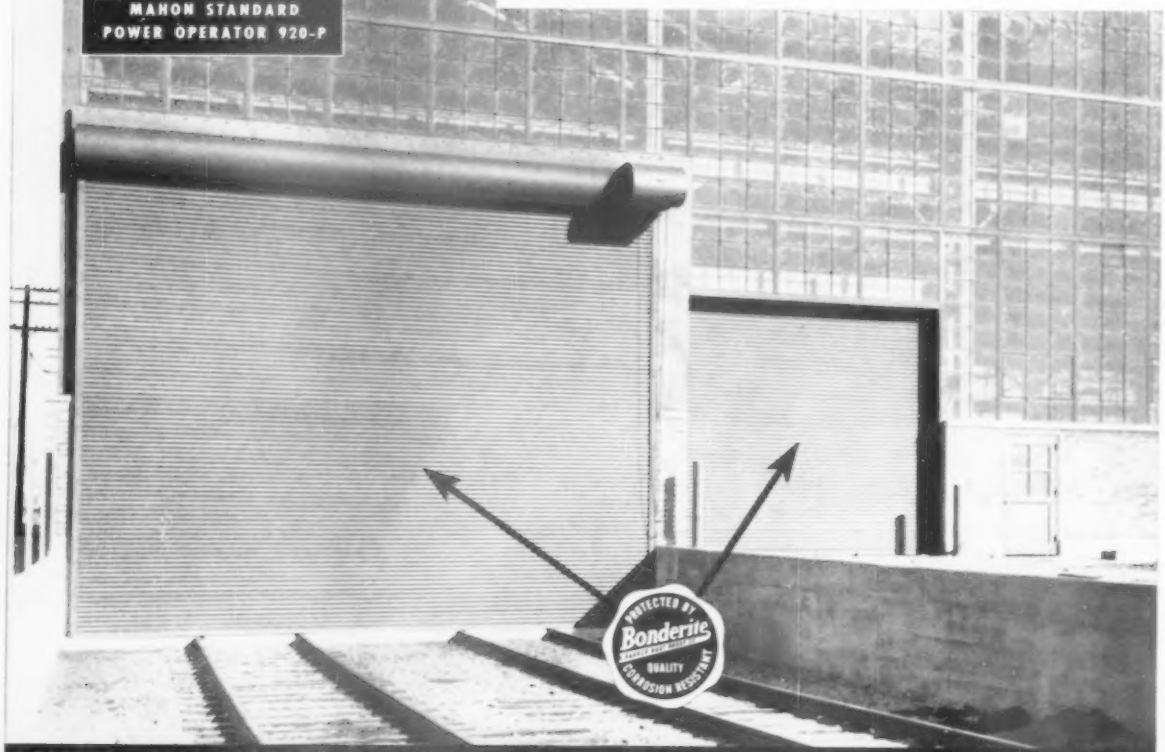
MAHON STANDARD POWER OPERATOR 920-P

In railroad and truck openings in industrial plants and shops, and in shipping and transfer dock openings, Rolling Steel Doors offer definite space saving and timesaving advantages. The vertical roll-up action of the door curtain requires no operating space either inside or outside of the opening—there are no overhead tracks to restrict headroom. And no other type of door can give you the positive security, firesafety and permanence of a good Rolling Steel Door. When you buy rolling steel doors, it will pay you to check specifications carefully . . . you'll find, through comparison, that Mahon Rolling Steel Doors are built better to give you better service over a longer period of time. See Sweet's Files for complete information, or write for Catalogue G-58.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago • Representatives in Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Underwriters' Labelled Rolling Steel Fire Doors and Fire Shutters, Underwriters' Rated Metalclad Fire Walls, Insulated Metal Curtain Walls, Electrified M-Floors, Acoustical and Troffer Forms, Acoustical Metal Ceilings, Steel Roof Decks, and Long Span M-Decks.



ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Typical Installation of Mahon Power Operated Rolling Steel Doors in a Double Railroad Opening and a Truck Opening in a Modern Industrial Plant.

MAHON

160-B

For more facts circle 538 on Reader Service Card

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

131—Bin-and-Rack Hand Truck can be used with maker's Stackbins and Stackracks as a stock cart to provide parts where needed. Unit's mobility allows fast bulk replenishment of parts supplies, and permits custom-made supply setups at assembly stations. *Stackbin Corp.*

132—Safety Work Shoe offers a bonus over conventional steel toe protection: three overlapping steel plates up the front protect the entire forepart of foot. Neoprene-cork outsole and heel provide excellent skid-resistance on slippery jobs. *Lehigh Safety Shoe Co.*

133—Steel Locker Line includes single-, double-, and multiple-tier locker styles. For space savings, the line's two-person, duplex lockers provide full-height locker compartments for two people in space occupied by one single-tier unit. *Alan Wood Steel Co.*

Turn the page

bright for life

thanks to **CHAMPION LIGHTMANSHIP**

MILLIONS OF LAMPS A YEAR . . .
ONE PLANT standard of quality control

With all manufacturing concentrated in the big, modern plant shown above, every Champion lamp is subjected to a single, high standard of quality control.

Uniform control like this is one more example of how Champion applies Lightmanship to make sure you always get all the light you pay for in Champion lamps.

CHAMPION LAMP WORKS
Lynn, Massachusetts
A division of Consolidated Electric Lamp Co.

CHAMPION *Lamps*
Incandescent Fluorescent
Your best buy in lamps

Announcing...

PROJECT

INFO

Whatever your industry...whatever your product...if electronics is now at work for you, INFO can become important to your operations.

Ask your nearest RCA Industrial Tube Distributor to tell you how!

RADIO CORPORATION OF AMERICA
Electron Tube Division **Harrison, N. J.**

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

134—Switch-Box Lock-Out prevents any power source from being thrown on while several men are working on the same power line. Up to seven padlocks can be so used that the power source can't be thrown until the last man removes padlock. *Dayton Rogers Mfg. Co.*

135—Air-Operated Mask Washer, set up alongside paint spray booth, cleans clogged spray masks thoroughly while operator continues his work. Portable stand contains wash tank on upper shelf and 6-gal. drum on lower shelf to receive the waste solvent. *Protectoseal Co.*

Turn the page

Built to outlast others 4 times!

Model 8100

New ARO IMPACT WRENCH

- One-half inch, square drive, reversible, high-speed, 6,000 rpm.
- Impact mechanism consists of three functional parts.

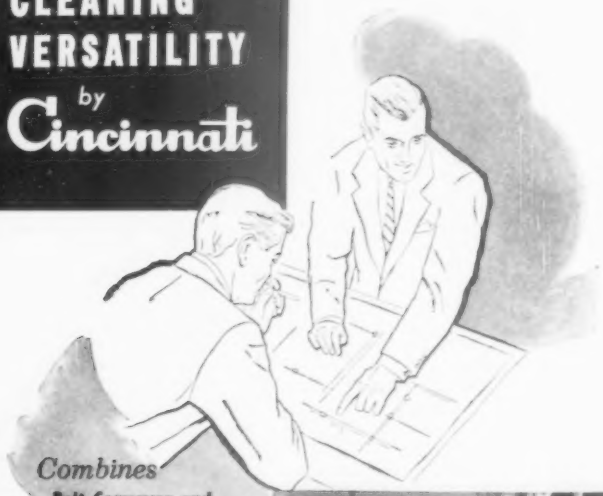
WRITE for complete literature. See your Aro Distributor.

THE ARO EQUIPMENT CORPORATION
GENERAL OFFICES—BRYAN, OHIO
Plants at Bryan and Cleveland, Ohio
Aro of California, 3141 S. Grand Ave., Los Angeles 7, Calif.
Aro Equipment of Canada, Ltd., Toronto 15, Ontario • *Offices in All Principal Cities*

ARO ® **AIR TOOLS**
Also . . . AIR HOISTS . . . LUBRICATING EQUIPMENT . . . AIRCRAFT PRODUCTS . . . GREASE FITTINGS

For more facts circle 541 on Reader Service Card

CLEANING VERSATILITY by Cincinnati



Combines

Belt Conveyor and Monorail Conveyor

- Rinses
- Rust Proofs
- Dries

Processes

- Steel
- Cast Iron
- Brass
- Aluminum
- Stainless
- Stampings
- Castings
- Screw Machine Parts
- Die Castings
- Machined Parts
- Forged Parts

In many cases, Cincinnati engineers are called upon to design equipment to clean one particular part. In others, they have to come up with a machine that will clean anything in the plant . . . present and future!

Installed in the New York State division plant of a noted American manufacturer, the machine illustrated is such a "jack of all trades." It handles all pre-finishing, pre-inspection and pre-assembly cleaning for the complete plant. It's another example of Cincinnati's ability to engineer equipment to a problem and to a budget, too.

What's your problem? Ask for a no-cost, no-obligation survey of cleaning requirements by: Cincinnati Cleaning & Finishing Machinery Co., 2021 Hageman St., Cincinnati 41, Ohio.

Use handy coupon for detailed literature

Monorail belt, drum or special types:

- Complete Finishing Systems
- Washing Machines
- Phosphatizing Machines
- Ovens
- Paint Application Equipment
- Soap Coating Machines

CINCINNATI CLEANING & FINISHING MACHINERY CO.
2021 HAGEMAN STREET CINCINNATI 41, OHIO

Send ( ) information on _____

( ) Complete catalog

Name _____ Title _____

Firm _____

Address _____

City _____ Zone _____ State _____

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

136—Fastening Tool, powder-actuated "Flite-Chek", has tapered interceptor jaws that prevent passage of an overpowered fastener or one that encounters soft or thin spot in work surface. Tool uses ¼-in. fasteners with plastic tips. *Olin Mathieson Chemical Corp.*

137—Hoist Trolley, powered by an axial-piston air motor, exerts 250-lb. drawbar pull on a beam through its rugged spring-loaded neoprene drive wheel. "Hoistractor" can also be used to power a traveling bridge crane; will pull a 2-ton load at 70 fpm. *Gardner-Denver Co.*

138—Shackles forged from C-1030 steel are said by maker to have guaranteed capacity 50% higher per size than common shackles. Capacities range from 1/3 ton to 75 tons; each shackle has its rated safe working load stamped on body. *American Hoist & Derrick Co.*

Turn the page

WHICH IS RIGHT FOR YOU?

In Heavy Duty or Standard Models...now, there's an Automatic Transporter to fit your job exactly

Choose Heavy Duty Model WPY with the larger battery and greater power for continuous long runs—heavy ramp travel—longer-than-average work days—or get up to two days' light duty operation per charge.

Choose narrow-battery Model WP for work in narrow aisles or other cramped areas—where higher clearance is needed at crown of ramps—and many other services where extra battery capacity isn't needed.

Automatic Low Lift Transporters come in both pallet or platform types in the wide and narrow models. Capacities, 4,000 to 15,000 lbs. depending on model. Plug-in charger is optional equipment. All models are available on convenient purchase terms or can be leased for as low as 27¢ per hour.* Mail coupon today for further information.

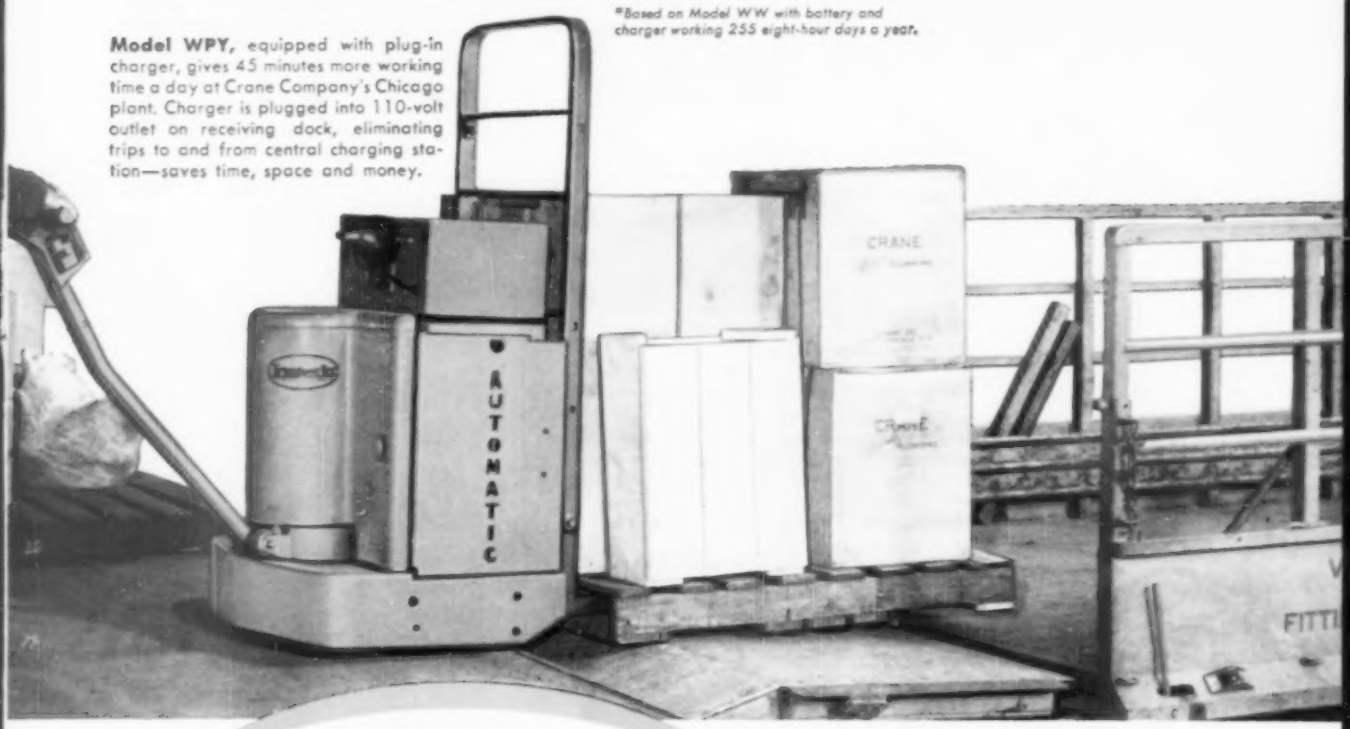
Model WP works easily in cramped quarters between machines.

AUTOMATIC TRANSPORTATION COMPANY
Division of The Yale & Towne Manufacturing Company
39 West 87th Street, Dept. D-8, Chicago 20, Illinois

WORLD'S LARGEST EXCLUSIVE BUILDERS OF ELECTRIC-DRIVEN INDUSTRIAL TRUCKS

*Based on Model WW with battery and charger working 255 eight-hour days a year.

Model WPY, equipped with plug-in charger, gives 45 minutes more working time a day at Crane Company's Chicago plant. Charger is plugged into 110-volt outlet on receiving dock, eliminating trips to and from central charging station—saves time, space and money.



Electric
Automatic®
Industrial Trucks

Cost Less to Own...Less to Operate

For more facts circle 543 on Reader Service Card

MAIL COUPON FOR DETAILS...

AUTOMATIC TRANSPORTATION COMPANY
Division of The Yale & Towne Manufacturing Company
39 West 87th Street, Dept. D8, Chicago 20, Illinois

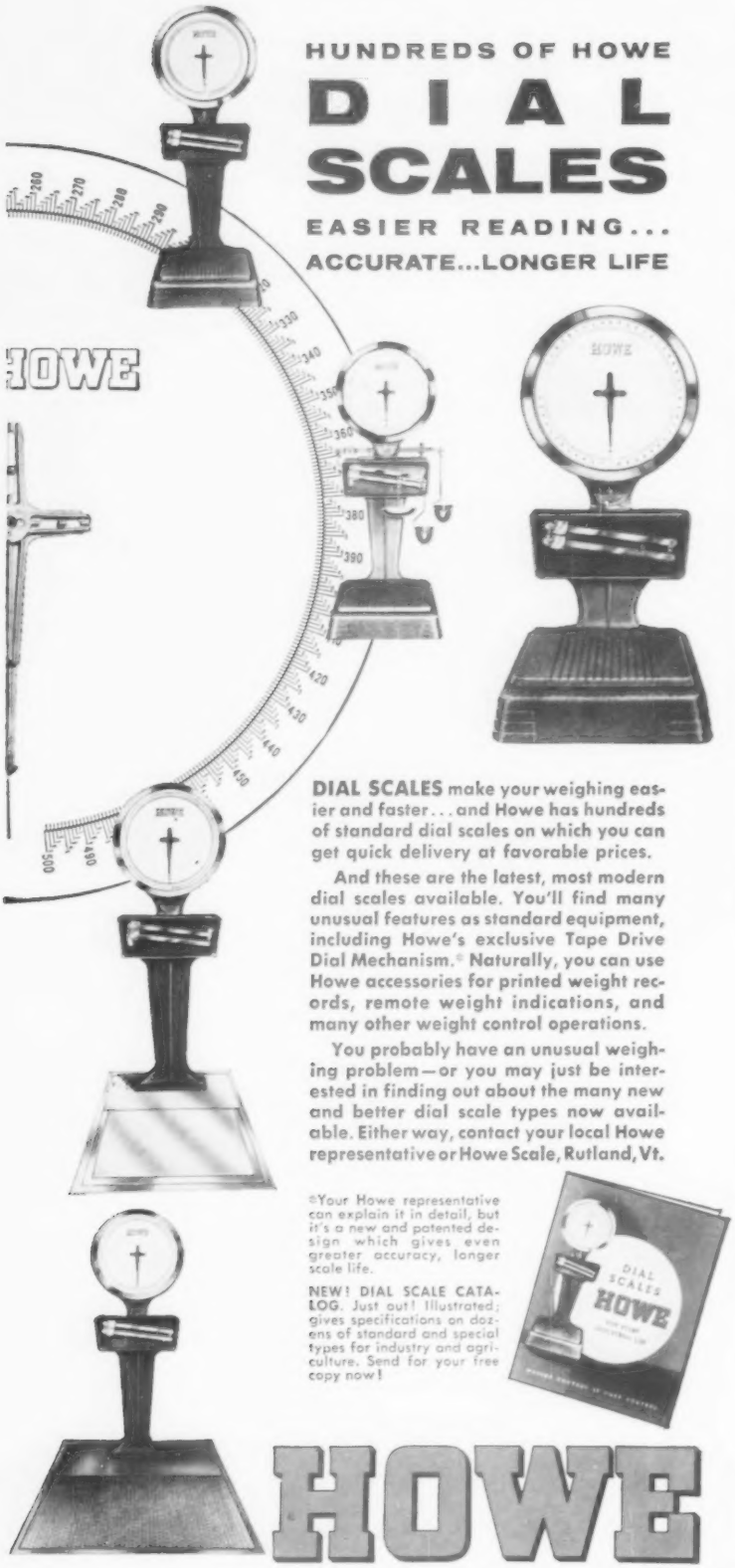
☐ Please rush me complete information on Automatic Electric Transporters
☐ Lease and purchase plans

Name.....Title.....

Firm.....

Address.....

City & Zone.....State.....

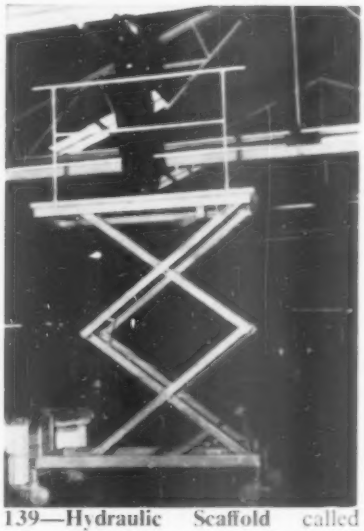


THE HOWE SCALE CO. • RUTLAND, VERMONT
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

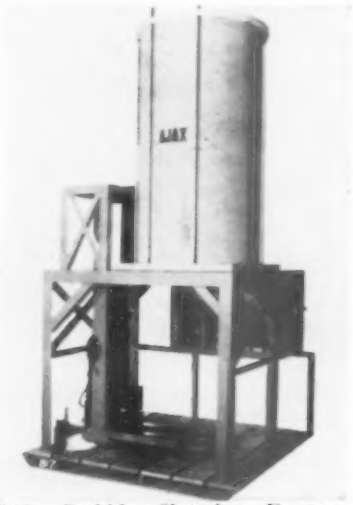
FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

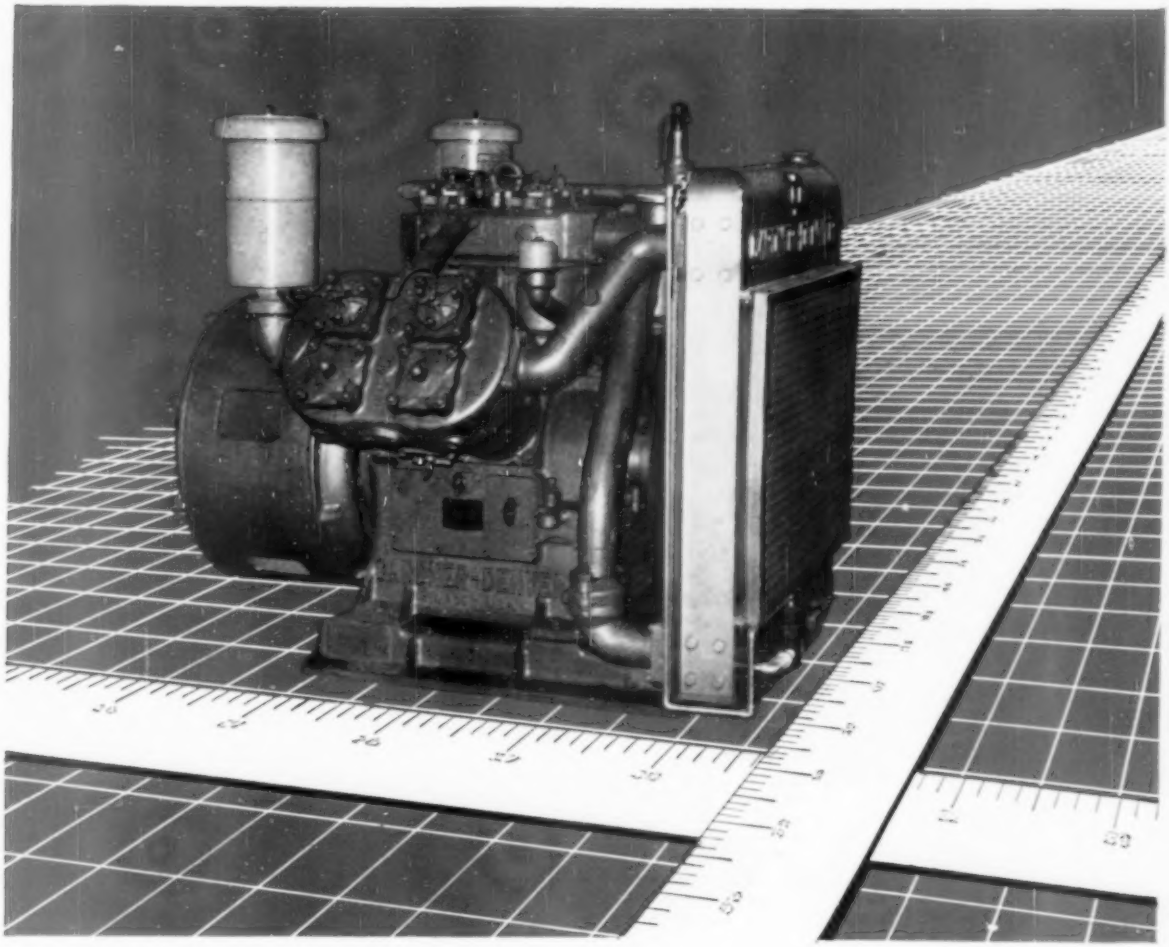


139—Hydraulic Scaffold called "Sky Witch" is portable. Comes in many models and sizes for varied applications. Models for mounting on trucks as well as mounted on casters, capacities from 750 to 5000 lb., elevations up to 35 ft. *The Charles Machine Works, Inc.*



140—Carbide Sintering Furnace, using high frequency induction heat, can be operated at temperatures upward of 2500 C. Platform swings out for bottom loading, then swings back beneath furnace; hydraulic lift carries material up into furnace. *Ajax Electrothermic Corp.*

Turn the page



Made to the measure of smaller space— this high-capacity Gardner-Denver compressor

Lots of power and high capacity in a compact, space-saving package. That's the Gardner-Denver WBN compressor—an easy, economical way to side-step the soaring cost of factory floor space.

Occupying only 34 sq. ft. of space, this 200 hp unit is rated at 1150 cfm piston displacement. In many instances, this volume permits retirement of two smaller units, with corresponding savings in space.

The Gardner-Denver WBN needs no special base. Just bolt it down, hook it up and put it to work. It is available with a self-contained radiator-intercooler that conserves cooling water, or with a tube-type intercooler.

Gardner-Denver compressors are available in seven space-saving models—from 39" to 72" long, 47" to 68" wide and 25 to 200 horsepower.

Write for complete information

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

For more facts circle 545 on Reader Service Card

The truck with "boarding house reach" INCREASES WAREHOUSE CAPACITY . . . as much as 50%

RAYMOND

Reach-Fork

TRADE MARK

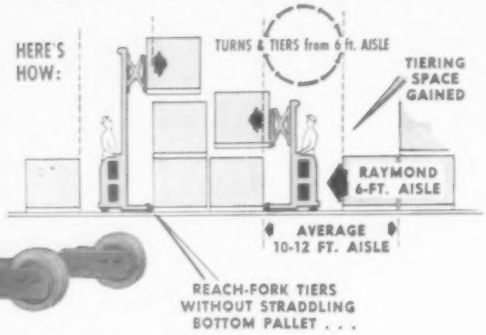
3000 lb. CAPACITY

WHY BUILD OR LEASE additional storage when there's space to be had right in your present warehouse? A Raymond Reach-Fork . . . the truck with "boarding-house reach" . . . may increase your warehouse capacity up to 50%.

THE REACH-FORK eliminates wasteful 10 to 12-ft. aisles . . . permits you to tier in space-saving 6-ft.* aisles. No special racks or pallets required because it operates from the aisle, without straddling bottom pallet. Its forks extend to pick up or deposit your load . . . retract in seconds.

IDEAL FOR LOADING and unloading. Stacks pallets closely on racks, in truck trailers, boxcars, bulk storage areas. Safe on elevators and low-capacity floors. Raymond power unit is highly accessible, opens up like a book for ease in servicing. Reach-Fork available in 2,000 or 3,000 lb. capacities . . . may be leased or purchased over 1 to 3-year periods if you wish.

HERE'S HOW:



MODEL E3RT Reach-Fork Electric Tiering Truck. Telescopic model, 3,000 lb. cap.

*For exact aisle width, ask Raymond representative to survey your operation.

THE RAYMOND CORPORATION

3231 Madison St., Greene, N. Y.

Please send Bulletin on Raymond Reach-Fork. I am interested in:

- ☐ 2,000 lb. cap. Reach-Fork.
- ☐ 3,000 lb. cap. Reach-Fork.
- ☐ Have a representative call.

MAIL COUPON TODAY

NAME _____ TITLE _____

COMPANY _____

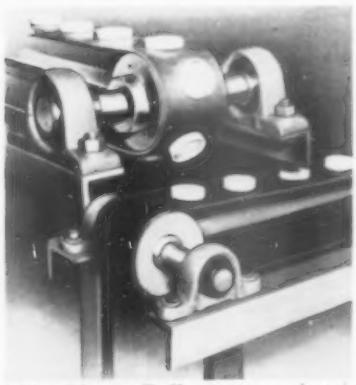
STREET _____

CITY _____ STATE _____

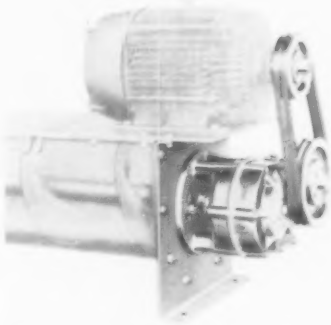
FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.



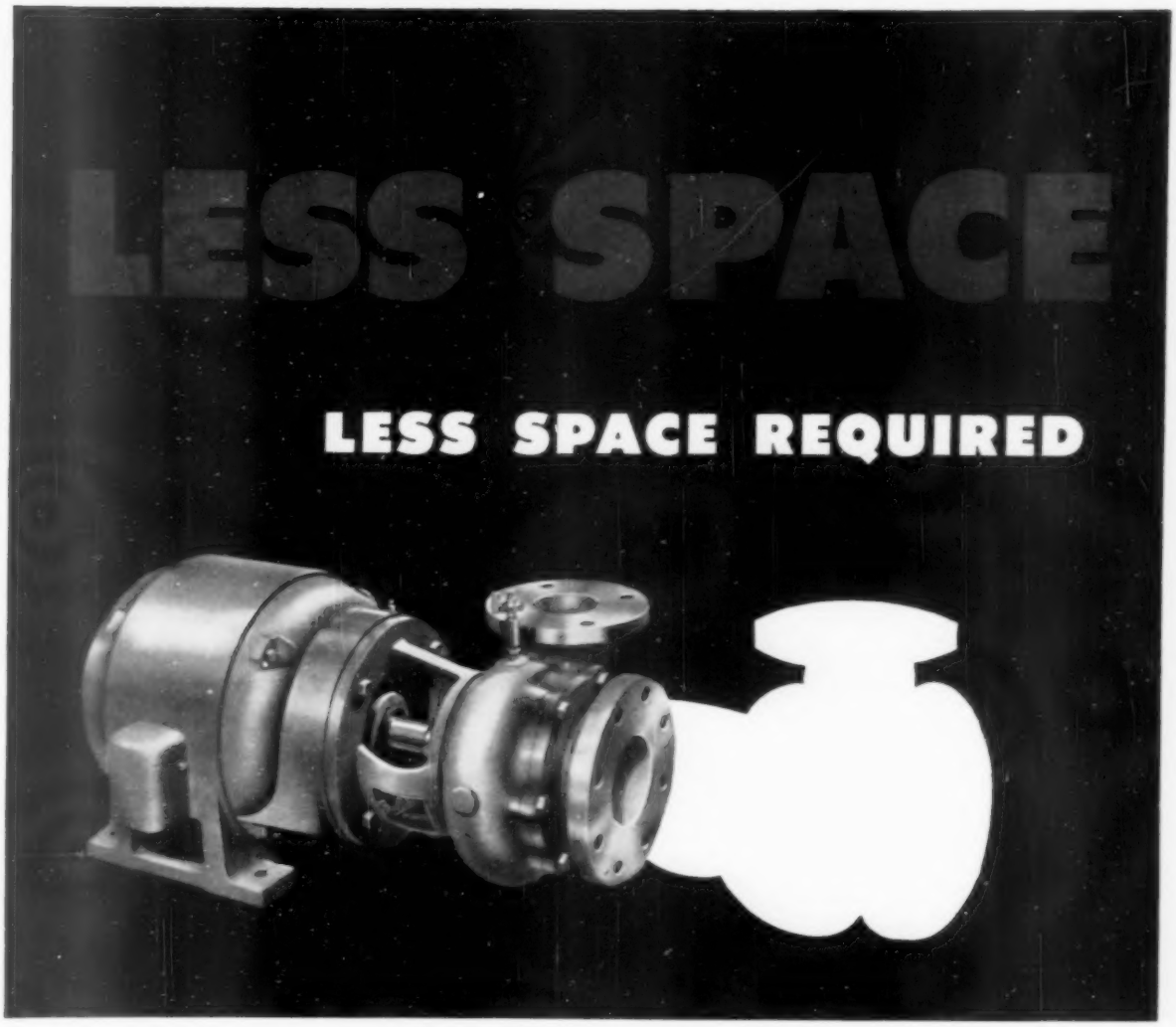
141—Magna-Rolls are non-electric magnetic flat-face rolls of 2½- to 30-in. dia. that serve as head or tail pulleys in conveyor systems. In photo, Magna-Roll in upper conveyor lifts metal parts on lower belt, turns them over, carries them in new direction. *Eriez Mfg. Co.*



142—Screw Conveyor Drive, simple to mount on ends of standard screw trough, consists of speed reducer and drive shaft. Packing gland protects speed reducer unit from material handled. Four sizes available, each offered in ratios of 18:1 and 8:1. *Dodge Mfg. Corp.*

143—Movable Partitions come in a variety of baked enamel colors in two types: Type F, a flush wall type; and Type B, a panel type with hardboard, asbestos board, or glass paneling. Complete range of sizes available. *Mult-A-Frame Div., Ainsworth-Precision Castings Co.*

Turn the page



WHEN YOU USE "BUFFALO" CLOSE-COUPLED PUMPS

"Buffalo" CCL Close-Coupled Pumps can't be beat where space is limited. They are easy to install with permanently aligned shafts and adjustable discharge angle. This provides extreme adaptability in piping and mounting.

Thanks to 81 years of engineering experience, "Buffalo" Close-Coupled Pumps insure you a long, trouble-free life of dependable service. Their rugged construction includes heavy cast mounting brackets, sturdy shells, accurately machined impellers, and deep stuffing boxes.

Where you need space-saving pumps, designed to deliver *extra* years of clear water service, be sure to use "Buffalo" CCL Close-Coupled Pumps, capacities to 1100 GPM. Bulletin 975-D gives you full information. Write for it today.

You're assured of value in "Buffalo" products by the "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.

BUFFALO PUMPS
DIVISION OF BUFFALO FORGE CO.
471 BROADWAY • BUFFALO, N. Y.
Canada Pumps Ltd., Kitchener, Ont.
Sales Representatives in All Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

For more facts circle 547 on Reader Service Card

Now! Stop Costly Waiting at Tool Crib with McCaskey Tool Control System!

Now . . . newly developed procedures in McCaskey's famous Tool Crib System . . . completely eliminate time lost by highly paid machine operators drawing and returning tools. Crib attendants prepare kits of tools for jobs or operations in advance. Machine operators simply pick them up or they may be delivered to their machines.

Newly designed tool orders are quickly written by crib personnel, by operators at machines or crib or both. Result: No wasted time at tool crib . . . more working time at machines . . . increased machine productivity.

The McCaskey System reduces tool purchases by cutting crib inventories. Reduces tool breakage, loss and theft. Cuts cost so many ways it pays for itself in a few months.

See complete demonstration at ASTE booth 732.

VICTOR

McCASKEY INDUSTRIAL CONTROLS

Production • Inventory • Tools • Maintenance • Costs

Division of

VICTOR ADDING MACHINE CO.

3900 N. ROCKWELL STREET • CHICAGO 18, ILL.

VICTOR-McCASKEY LIMITED
GALT, ONTARIO, CANADA

Manufacturers of Business Machines
Cash Registers, Business and Industrial Sytems
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Look for the Victor direct factory branch in the Yellow Pages under adding machines, or mail the coupon.

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McCASKEY INDUSTRIAL DIV., Dept. FM-458
3900 North Rockwell St., Chicago 18, Illinois

☐ Rush complete details about the new features of the McCaskey System.
☐ Send me your free booklet, "How Tool Costs Were Cut 12 Ways in 20 Plants."

Name .....
Position .....
Company .....
Address .....
City ..... Zone ..... State .....

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

144—Rubber Expansion Joints and flexible pipe provide flexible connections in pressure and vacuum systems handling water, brine, gases, chemicals. Sizes are from ½ in. to 72 in. ID., for working temperatures to 180 F., pressures to 150 psig. *General Rubber Corp.*

145—Spindicator keeps tabs on filter elements in oil hydraulic systems—shows at a glance when an oil filter is dirty. Spinner, mounted behind a window in the wall of unit, revolves only when filter element is clogged and needs cleaning. *Schroeder Brothers Corp.*

146—Variable Speed Belt made of oil- and heat-resistant neoprene is a link design adjustable to any length for use on various size drives. Eliminates vibration and is installed without dismantling machinery. Complete range of sizes. *Manheim Mfg. & Belting Co.*

Turn the page

Avoid costly down-time caused by electrical control failure....

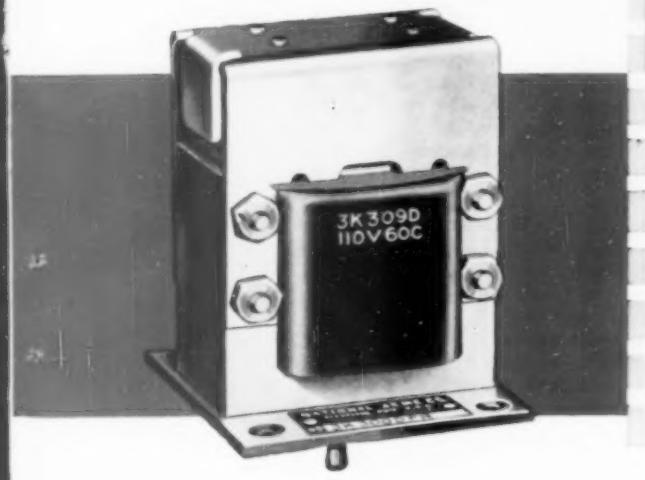
Nothing is more frustrating to the production man than downtime caused by the failure of a minor component. An $85,000 machine tool down because of a failure of a limit switch can be as expensive as if it were caused by a main bearing burnout. National Acme's electrical controls are designed by machine tool designers and built as machine tools are built. That means extra ruggedness, extra dependability but it does not mean extra cost.

GOLD-N-RING CONTROL SWITCHES

Oil-tight, water-tight, dust-tight. Built with heavy duty silver alloy contact points, over-size terminal screws, superior dielectric materials. For full information ask for a free copy of Bulletin ECS-56.

LIMIT SWITCHES

A full line of heavy duty Limit Switches designed originally for machine tool installation but now used wherever extra dependability, extra ruggedness and long life are required. For full information ask for a free copy of our Bulletin EM-51.



NAMCO SOLENOIDS

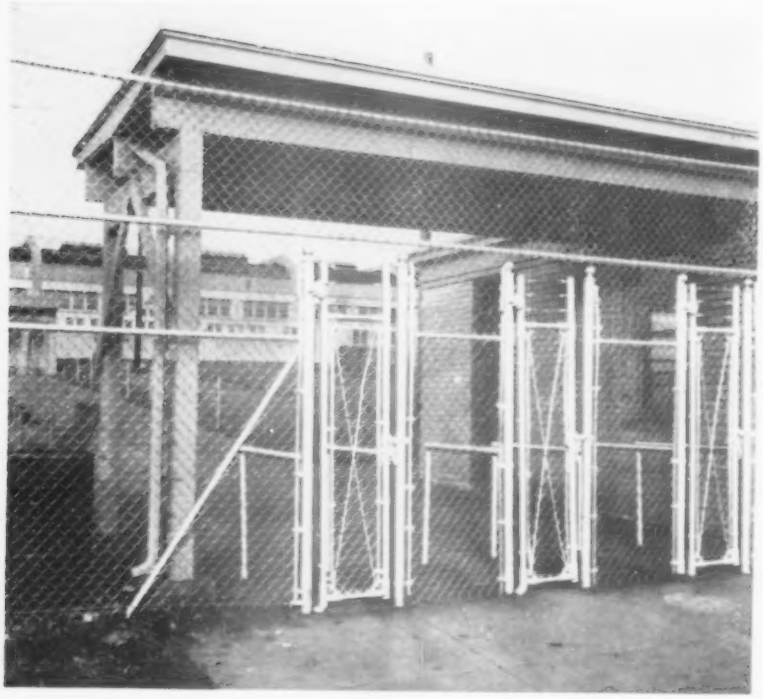
A full line of standard and custom made Solenoids for AC or DC use. Push or pull types with capacities up to 25 lbs. Bulletin EM-52A provides information on the application, design and installation of Solenoids. Write for your free copy today.

Electrical Manufacturing Division

National Acme

THE NATIONAL ACME COMPANY • 167 E. 131st St. • Cleveland 8, Ohio.

For more facts circle 549 on Reader Service Card



This fence will never rust, never need protective maintenance ...it's ALL ALUMINUM

All-aluminum chain link fencing is a long-term cost cutter. That's because, once installed, it can be forgotten. It will never rust or corrode—even in industrial areas where gases and fumes eat other metals away.

You *never* have to paint an all-aluminum fence, never have to replace sections because of rust or corrosion. It is good looking—and it stays that way.

Aluminum's lightweight strength can cut costs, too. All-aluminum fencing is easier to install, and it costs less to ship and handle.

Plan now for low maintenance costs for years to come—with rustfree, strong, corrosion-resistant all-aluminum chain link fencing, posts and fittings.

Watch Reynolds All-Family Television Program, "DISNEYLAND," ABC-TV

Get Details on All-Aluminum Fencing
Write Today for FREE Brochure

Reynolds Metals Company
P.O. Box 1300-NJ, Louisville 1, Kentucky

Please send me your free brochure on All-Aluminum Chain Link Fencing.

Name _____

Company or Office _____

Address _____ City _____

Zone _____ State _____

FACTORY / EQUIPMENT NEWS

Begins on page 140

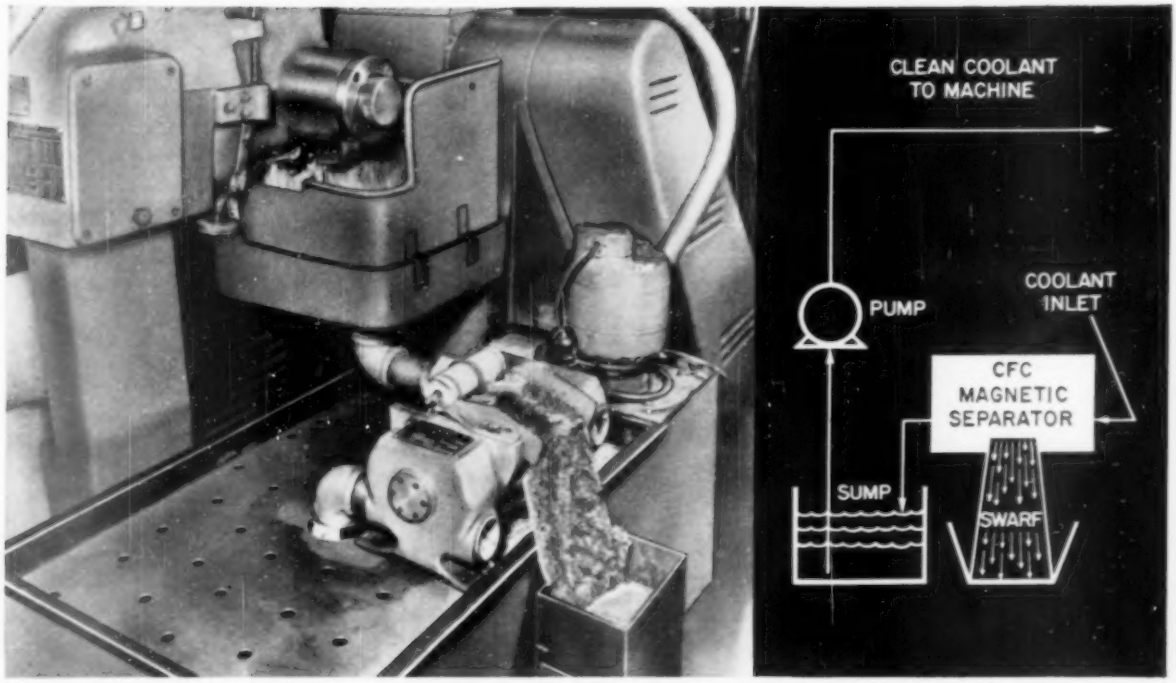
For more about these items, circle item numbers on Reader Service Card next to back cover.

147—Steel Stools for wide plant use feature revolving, adjustable wood seats (flat or contour type as shown) and tubular welded steel bases. Models offered in three adjustable height ranges: 17 to 21 in., 22 to 26 in., and 27 to 31 in. *Standard Pressed Steel Co.*

148—Floor Machine for high-speed scrubbing and polishing operations will clean 12,500 sq. ft./hr. One man operating it can, in a single pass, lay the cleaning solution, scrub, pick up dirty solution, and damp-dry a 24-in.-wide swath. *Advance Floor Machine Co.*

149—Rider Mower. 24-in. model, features a 5¼-hp. engine mounted in rear—where it dissipates heat and fumes away from operator. Ten forward speeds and one reverse cover heavy-to-light cutting conditions with no change in speed of rotary cutting blade. *Devere Co.*

Turn the page



CHIPS ARE NO CHALLENGE...

New low-cost CFC Magnetic Separator keeps coolants free of ferrous contaminants

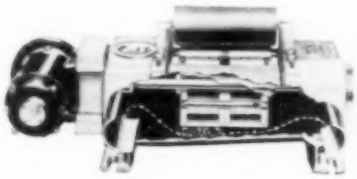
About the size of a typewriter — and not much more expensive — the new CFC Magnetic Separator continuously removes ferrous chips and sludge from machine tool coolants. Powerful Alnico permanent magnets revolve constantly and automatically. There's no downtime or maintenance labor. Laborious sump cleaning is reduced to a minimum. You're assured of longer tool and wheel life, better product finish, substantial coolant saving.

Compact and lightweight, the CFC Magnetic Separator is easy to install. It takes less than 2 square feet of floor space — can often be installed between machine tool columns. Unit includes totally enclosed gearhead motor. No separate pump is required. Choice of inlets and outlets make it easily adaptable to any machine tool — grinders, gear cutters, thread rollers, honing, broaching, milling, drilling machines, etc. Non-ferrous housing prevents rusting.

To provide prompt delivery, the CFC Magnetic Separator is stocked in many local areas.

LOOK AT THE PRICES!
As low as $325

Dimensions	**No. 1**	**No. 2**	**No. 4**
Length	21 5/16"	21 5/16"	22 3/4"
Height	7 7/8"	9 1/2"	11 7/8"
Width	11 3/4"	12 1/4"	15"
Capacity			
Mineral oil, max. operating viscosity 170 SUS	5 GPM	10 GPM	20 GPM
Water-Based Coolants	10 GPM	20 GPM	40 GPM
Price	$325	$410	$535



All units are sold on a money-back performance guarantee. Write for detailed drawings and technical literature to Dept. FA.

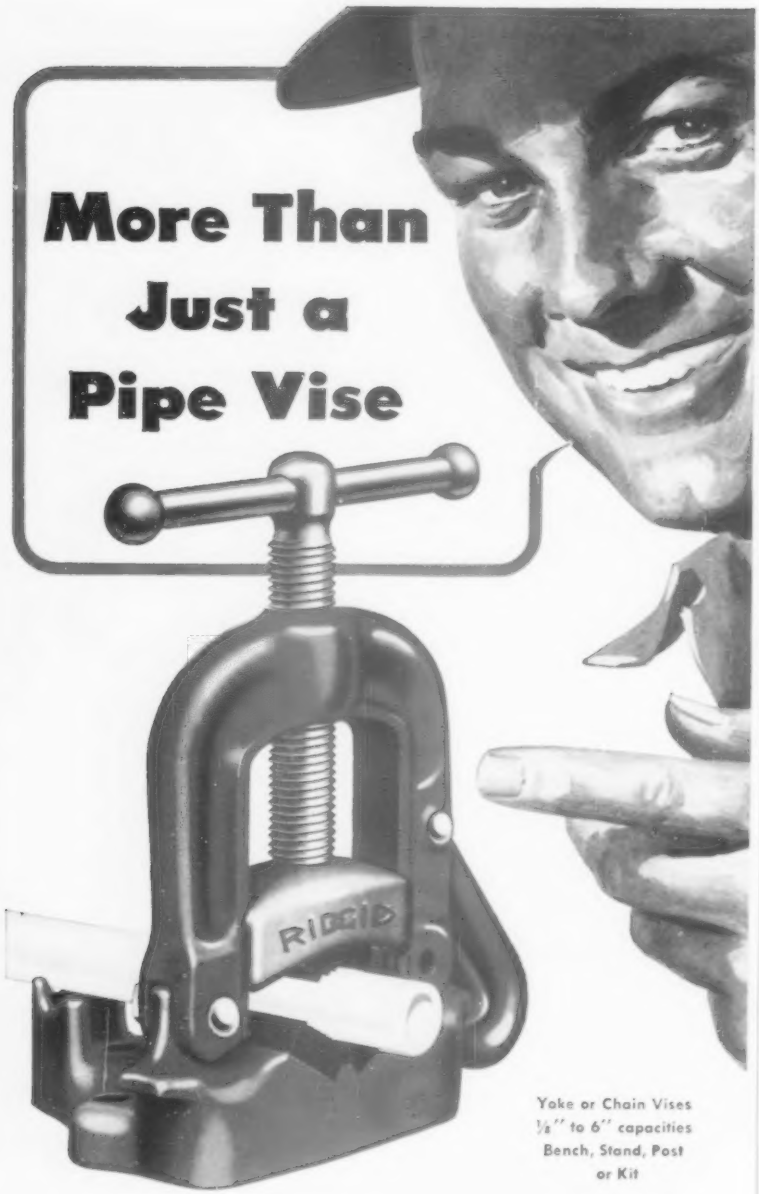
COMMERCIAL FILTERS CORPORATION
MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST

Fulflo FILTERS — *with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.*

CFC FILTERS — *Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.*

For more facts circle 551 on Reader Service Card



Yoke or Chain Vises
1/2" to 6" capacities
Bench, Stand, Post
or Kit

RIDGID

Pipe Vises give you most utility for your money

RIDGID LonGrip jaws take a firmer grip on pipe —and without chewing it up. Most of these vises have handy work-tray bases, pipe rests and pipe benders, doing more for you than merely holding pipe. It pays you to ask for RIDGID at your Supply House.

The Ridge Tool Company • Elyria, Ohio • U.S.A.

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

150—"Triplex" Hanger permits quick servicing of heavy high-bay lights at floor-level. Unit's multiple-fall pulley system for handline operation handles fluorescent, mercury, and incandescent luminaires and clusters weighing up to 120 lb. *Thompson Electric Co.*

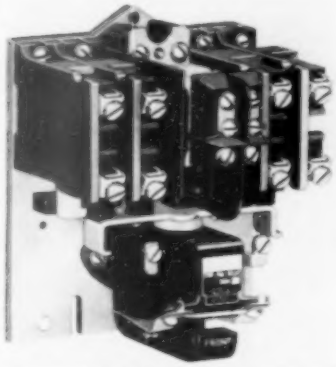
151—Steel Shop Equipment line includes 21 work benches, two utility carts, eight different styles of tool stands, two shop desks, and a table. Individual items are sturdy and functional—ideal for all kinds of production and assembly operations. *Burroughs Mfg. Co.*

152—Detachable Boom for maker's gas and LP-gas tractors operates with a winch and can be mounted in minutes. It's a handy attachment for users who occasionally need to lift or transport heavy products over short distances. Capacity of the boom is 7000 lb. *Mercury Mfg. Co.*

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

153—Midget "Electric Eyes" are designed to prevent production tie-ups caused by double feeding of sheet rock into presses and other machines. Surface of a single sheet reflects just enough light to let it pass; doubles are automatically stopped. *Ess Instrument Co.*

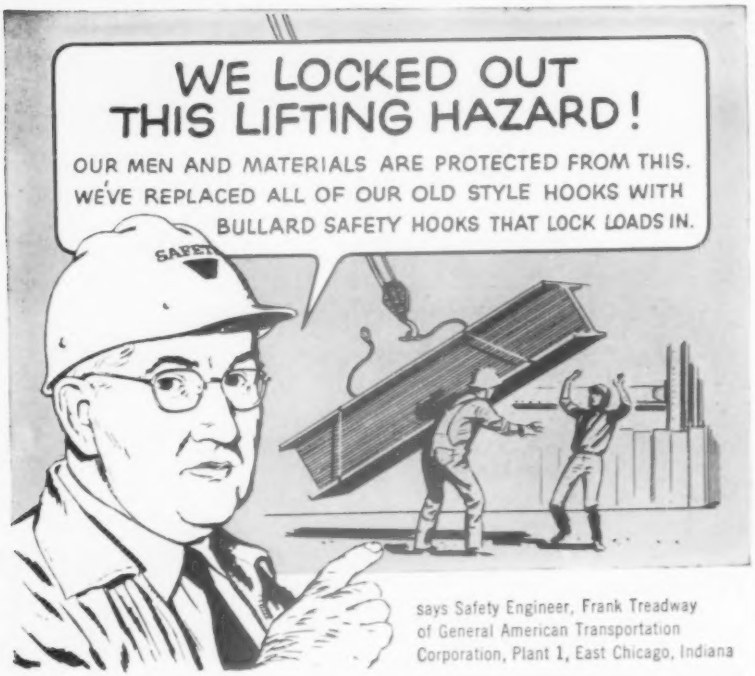


154—Latched-In Relays, mechanically held type "PML," are constructed to save an inch or more of vertical height between rows—modular construction provides a solid shelf along relay top for flat or bundled wiring. Two- to ten-pole models. *Clark Controller Co.*

155—Four-Wheel Freight Carts with removable and replaceable steel-bound hardwood decks are offered in capacities to 2000 lb., with 6- or 8- in. wheels of rubber or plastic. The 7/8-in. hardwood deck is replaced simply by removing six screws. *Lewis-Shepard Products.*

Turn the page

For more facts circle 553 on Reader Service Card



says Safety Engineer, Frank Treadway of General American Transportation Corporation, Plant 1, East Chicago, Indiana

Pushbutton lock
With gate open hook's throat is 100% clear
Available in sizes 1 to 16A for all type hoists, tuggers and come-alongs. Write for safety hook data sheet.
E. D. Bullard Co., 2680 Bridgeway, Sausalito, California

BULLARD
INDUSTRIAL SAFETY EQUIPMENT

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

156—Right-Angle Drill, weighing under 5 lb., is equipped with a right-angle head that swivels 360 deg. and locks in any position for drilling in cramped quarters. Head is removable for straight-on drilling; has ¼-in. chuck capacity. *Milwaukee Electric Tool Corp.*

157—Mechanical Seal has just two working parts held together by magnetic force—eliminating springs. Seal formed between the self-lubricating carbon and metal lapped faces is so tight maker says not even a molecule of helium gas can leak through. *A. W. Chesterton Co.*

158—Bantam Air Hammer has straight handle for one-hand operation in close or blind-spot work; or can be suspended from reels over production lines. Weighs 20 oz., uses 6.5 cfm. of air. Metering trigger lets operator control blows. *Superior Pneumatic & Mfg., Inc.*

Turn to page 177

RAILWAY EXPRESS AGENCY

. . . makes The Big Difference

The big difference is SPEED

Railway Express is a complete rail-air-sea shipping service that carries your shipment safely and swiftly to any of some 23,000 communities in this country—and, via Railway Express World Thruway Service, to almost any point abroad.

The big difference is ECONOMY

When you specify Railway Express, you can be assured of *real* economy. Railway Express picks up and delivers (within REA vehicle limits) at no additional charge. And one fixed charge is all you pay from point of origin to destination.

The big difference is DEPENDABILITY

Up-to-the-minute equipment and completely modern methods of operation, as well as specially trained personnel mean direct, dependable deliveries. So whatever you're shipping . . . near or far . . . always depend on Railway Express for transportation at its best.

TRAVELING OVERSEAS? Have your baggage meet you there! New low-cost service speeds excess luggage from your home town to your overseas destination. See your Railway Express agent for details!

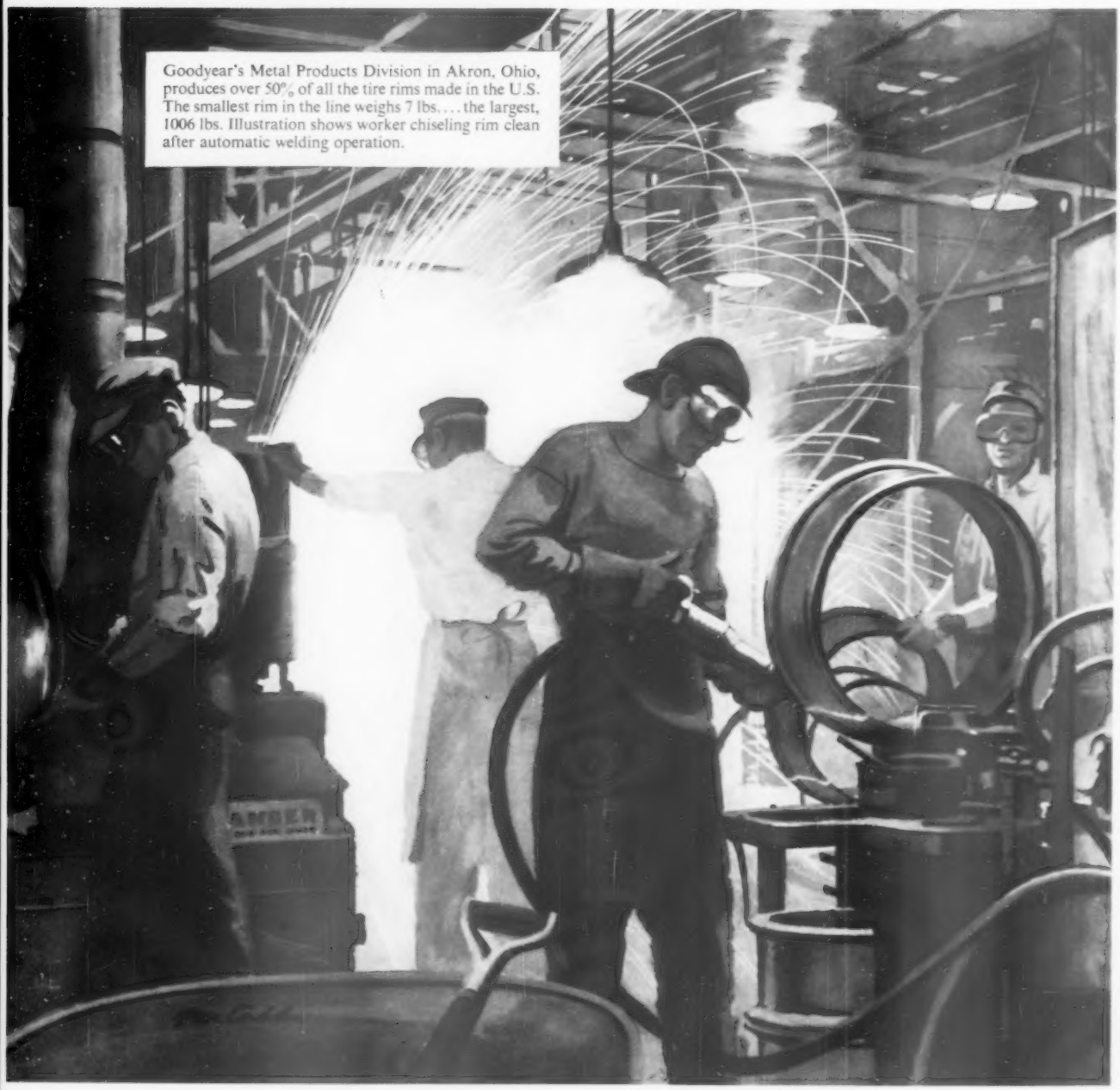
For more facts circle 555 on Reader Service Card

For more facts circle 556 on Reader Service Card ▶

176-A

Correct Lubrication in Action...

Hydraulic Pump Life



Goodyear's Metal Products Division in Akron, Ohio, produces over 50% of all the tire rims made in the U.S. The smallest rim in the line weighs 7 lbs.... the largest, 1006 lbs. Illustration shows worker chiseling rim clean after automatic welding operation.

Mobil

Complete Engineering Program
Proved Petroleum Products

Mobil

SOCONY MOBIL OIL CO., INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP., MOBIL OVERSEAS OIL CO., INC.

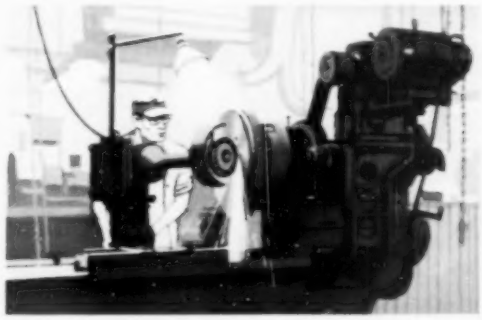
Increased as much as 221%

One of the ways Socony Mobil helped The Goodyear Tire and Rubber Company save over twice the cost of lubricants purchased in 1957

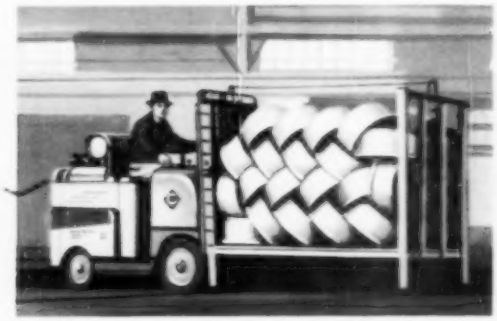
Nearly 100 pumps actuate the hydraulic presses and other equipment used to produce wheel rims at Goodyear's Metal Products Division. Under a Mobil program of Correct Lubrication some of these pumps have been in continuous service twice their expected life. Others with a normal plant service life of five years are still operating after *11 years*. This plant has never had a pump failure due to lubrication since the Mobil program began.

The fact that a pump failure, besides halting production, can cost up to $400 for labor and $3300 for other repairs underscores this record.

Here is another example of Correct Lubrication in Action. This cost-cutting Mobil Program gives you the benefit of complete engineering service throughout your plant . . . plus the benefits of Mobil's laboratory facilities . . . and 92 years of lubrication experience. It is turning maintenance costs into profits for The Goodyear Tire and Rubber Company. Why not for you?



$21,400 saved. Under the Mobil Program, Goodyear, to achieve maximum economy, purchases only the highest quality oils. Mobil engineers constantly check oil condition . . . advise when to reclaim. This assures minimum replacement with new oil.



$825 a year saved. Mobil engineers helped set up maintenance pattern for Goodyear's many stock handling trucks . . . made motor oil recommendation. Result—motor overhaul period extended from every three months to every four years.

$6,000 a year saved. High temperatures in paint drying ovens caused stoppage of conveyor system . . . cost $500 a month in labor and materials. Mobil recommendation of special grease eliminated breakdowns.

Total 1957 savings—2.7 times purchase price of oils and greases. Through close cooperation between company personnel and Mobil engineers, maintenance costs are held to a minimum...oils deliver maximum life.

Correct Lubrication

Another reason You're Miles Ahead with Mobil!

Weldynamics

ARC WELDING AT WORK CUTTING COSTS

WHY WELDORS AND MANAGEMENT LIKE IMPROVED FLEETWELD 47

Improved Fleetweld 47 gives that fast, easy operation . . . yet it isn't limited to the flat position.

Weldors appreciate the smooth flowing action!

Management loves the cost-cutting speed and versatility.

Try Improved Fleetweld 47 on your next flat and uphill production job. You'll love it too! It conforms to AWS E-6013 and E-6014.

Write for the *new* Weldirectory Bulletin 7000.1.

Lincoln men who know Weldynamics will help you establish procedures, select equipment and electrodes for most efficient, low-cost welding.

The World's Largest Manufacturer of Arc Welding Equipment

LINCOLN

© 1958 The Lincoln Electric Company

THE LINCOLN ELECTRIC COMPANY, DEPT. 3722, CLEVELAND, OHIO

For more facts circle 557 on Reader Service Card

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

159—Vacuumized Sweeper for large plant and yard areas sweeps a 7-ft., 4-in. path, handles easily in congested areas. Its powerful vacuum system forces dust-laden air through a filter system that's said to remove dust particles invisible to eye. *G. H. Tennant Co.*

160—Heavy-Duty Conveyor Unit called "Hustler" is built to handle heavy metal stampings between presses—and other heavy parts and assemblies as well. Working height can be adjusted up-and-down, pitch adjusted for any angle up to 45 deg. *May-Fran Engineering, Inc.*

161—Floor Patching Mixture called "Emeri-Quikpatch" permits fast concrete floor repairs without danger of softening or rutting out. The emery-based, non-resilient patching material cures and becomes serviceable overnight—and is long wearing. *Walter Maguire Co.*

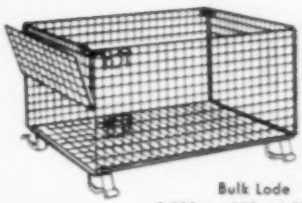
Turn the page

A SINGLE SOURCE...

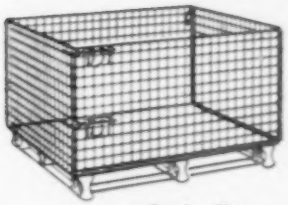
for SAVINGS

USP

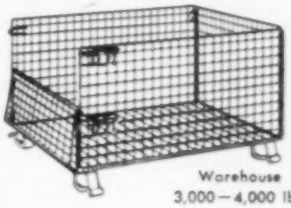
PALLETAINERS®



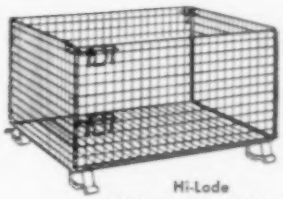
Bulk Lode
2,000 – 4,000 – 6,000 lbs.
Capacities



Bearing Plate
2,000 – 4,000 – 6,000 lbs.
Capacities



Warehouse
3,000 – 4,000 lbs.
Capacities



Hi-Lode
2,000 – 4,000 – 6,000 lbs.
Capacities

The big, new Palletainer catalog will be sent to you immediately without obligation. However, should your problem require immediate assistance our nearest representative will contact you at your request.

Interested in getting more out of your materials handling dollars? Then send for your copy of Union Steel's big, well illustrated Palletainer catalog.

It will quickly and clearly indicate how you can make important savings in materials, time, space—and above all . . . man hours!

There are dozens of interestingly different applications that will show you new handling, storing, warehousing and shipping methods. Also, detailed information on Palletainers exclusive construction features plus complete specifications on the many versatile models available.

UNION STEEL PRODUCTS COMPANY
515 N. BERRIEN ST.
ALBION, MICHIGAN

Gentlemen: Please send me my copy of your new Palletainer catalog at once.

Name _____ *Title* _____
Company _____
Address _____
City _____ *Zone* _____ *State* _____

Please have your nearest Palletainer representative contact me ☐

For more facts circle 558 on Reader Service Card

PRODUCTION MORE THAN TRIPLED . . . PAINT MILEAGE INCREASED 75% WITH

Ransburg

NO. 2 PROCESS

One Ransburg reciprocating disk uniformly coats 7 complete sets of gasoline pump housings and parts per gallon of paint. Former hand spray produced only 4 sets per gallon.

● Bowser, Inc. Fort Wayne Division is continuously on the lookout for improved manufacturing methods in the production of their quality line of gasoline pumps.

That's why they modernized their finishing department . . . installed a conveyor . . . new oven . . . and replaced hand spray with one RANSBURG No. 2 PROCESS reciprocating disk unit.

RESULTS? Paint mileage increased 75% with less labor. With hand spray, they painted enough pump housings and parts for 4 pumps per gallon of paint. Now, with *Electrostatic,* they're painting 7 complete pump sets per gallon.

Where Bowser formerly needed two shifts in finishing, one shift now handles even greater production. With hand spray and limited oven facilities, they used to turn out 15 sets per hour. Now, they can paint 55 sets an hour, either prime or finish. Color changes are made quickly and easily with Ransburg equipment, and because of its efficiency in operation, maintenance cost in the paint area is cut 50%.

NO REASON WHY YOU CAN'T DO IT, TOO!

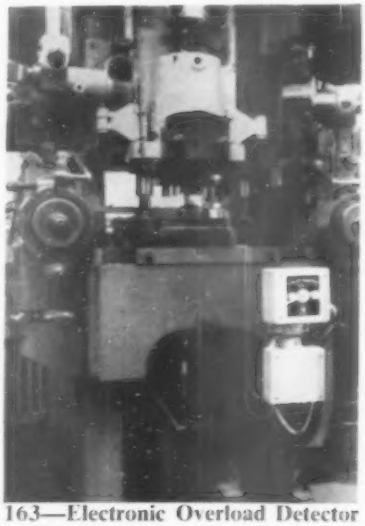
Whatever your product, if it's painted, we'd like to tell you more about the worthwhile savings and advantages which can be yours with RANSBURG ELECTROSTATIC PAINTING PROCESSES. Write for our No. 2 Process brochure which cites numerous examples of electrostatic spray painting on a wide variety of products.

Ransburg **ELECTRO-COATING CORP.**
Indianapolis 7, Indiana

RANSBURG

For more about these items, circle item numbers on Reader Service Card next to back cover.

162—Hydraulic Lift is a pan-type stationary model for constant level feeding operations. It's ideal for feeding paper, plywood, sheet steel, and other loads into machines and processes as high as 120 in. from the floor. Capacity is 4000 lb. *Langley Mfg. Co.*

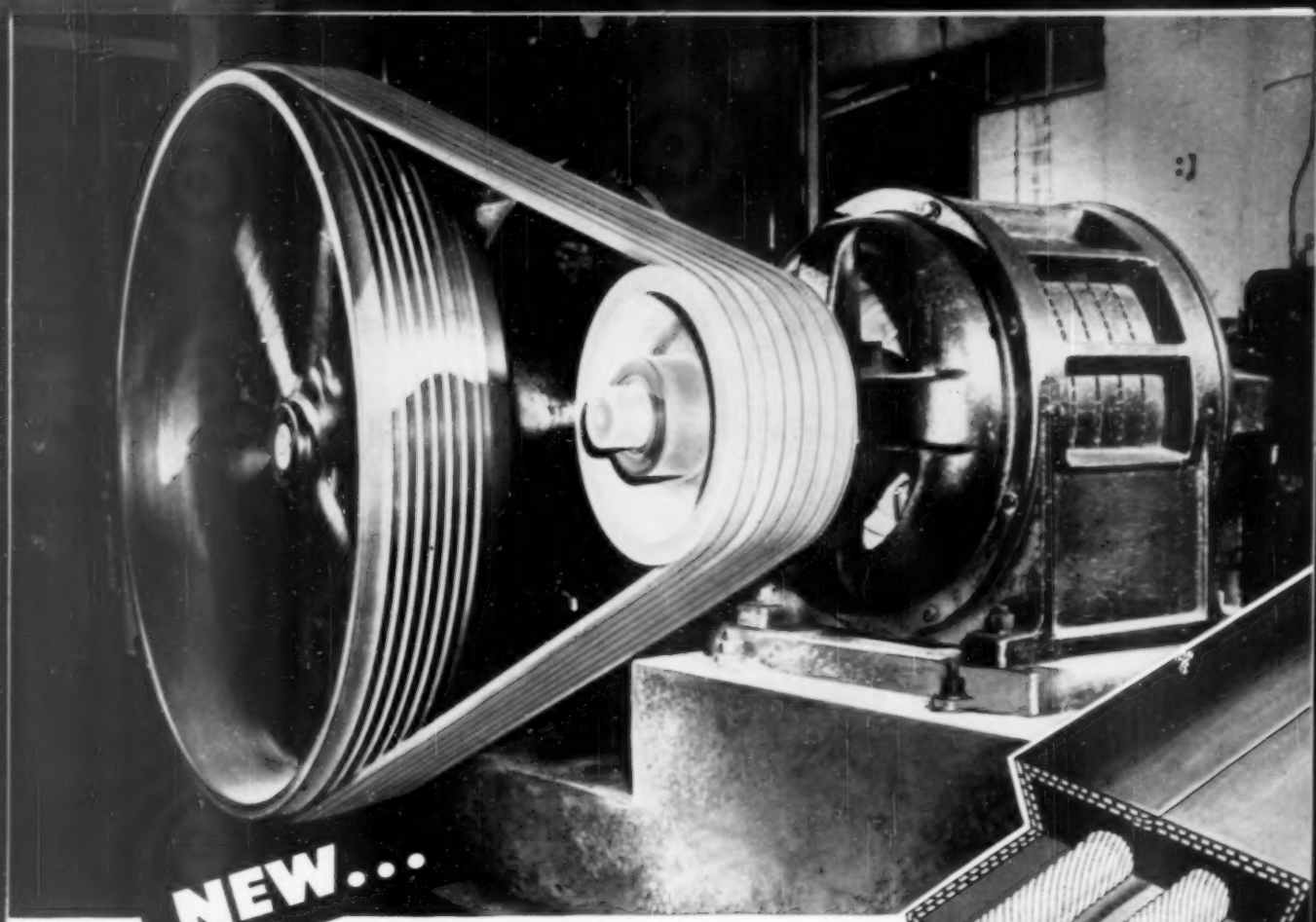


163—Electronic Overload Detector automatically shuts down power presses and machinery when misfeed or other malfunction of equipment occurs. It prevents costly breakdowns and die damage; requires no pre-setting or adjustment. Sells for $179. *Wintriss, Inc.*

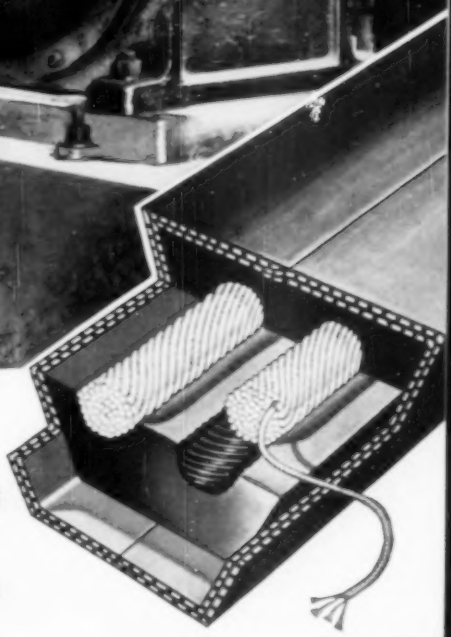
Turn the page

For more facts circle 559 on Reader Service Card

For more facts circle 560 on Reader Service Card ➤



NEW...



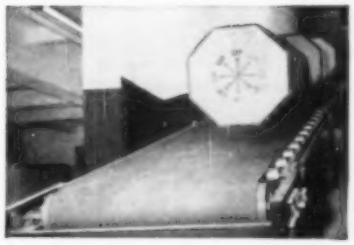
Thermoid Powerflex Hi-Capacity V-Belts

40% stronger than standard belts!

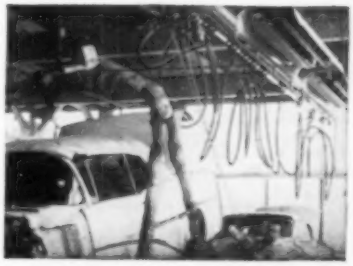
Where more driving power is called for, switch to Powerflex Hi-Capacity V-Belts. These new *premium* belts can step up the drive capacity of "under-belted" drives by as much as 40%.

If your present belts are being stretched beyond their take-up allowance . . . or if you're going to replace worn or damaged pulleys . . . change to Powerflex Hi-Capacity V-Belts. They permit you to use fewer belts and narrower sheaves . . . reduce drive costs.

Powerflex Hi-Capacity V-Belts are available in all standard sizes, and feature a special oil-resistant cover which prolongs belt life. Static conducting covers can be supplied. Order from your Thermoid Distributor, or write direct for complete information.



There's a Thermoid Conveyor Belt



. . . and Thermoid Hose for every job.

Thermoid

THERMOID COMPANY • Trenton, N. J.

These labels can't come off

They're facsimile labels. You print them directly on cartons. Saves cost of real labels. Faster than brush stenciling. Cuts shipping losses.

Here's a fast, systematic way for addressing multiple shipments. In one easy motion, you can imprint both a facsimile label and customer's address directly on a carton. 30 to 40 cartons can be addressed in a minute. No labels to type or apply; no ink brushes and stencilboards to wield. Facsimile labels are sharp and clear, yet can be easily blocked out for re-handling by consignee.

All that's needed is a Weber handprinter and Kustom-Kut stencil. Stencils are die-cut with facsimile of your label. All you do is type the customer's address on the stencil and attach to the printer. Fast, neat, systematic and inexpensive. Write for full details on the Weber Facsimile-Label System.

Good for product identification marking too.

Weber marking systems

Division of Weber Addressing Machine Co., Inc.
Mount Prospect, Illinois

DEALER SALES AND SERVICE IN ALL PRINCIPAL CITIES

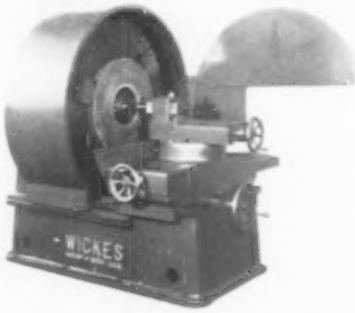
FREE BULLETIN
on Weber-Facsimile Label System. Just mail this coupon.

WEBER MARKING SYSTEMS
Dept. 26-D
Mount Prospect, Illinois

Company _____
Individual _____
Position _____
Address _____
City _____ Zone ____ State _____

For more about these items, circle item numbers on Reader Service Card next to back cover.

164—High-Bay Reflectors, two new models for 1000-watt mercury lamps, are available with and without drip shield. Model shown with protective drip-proof shield is suitable for areas having skylights, dormers, or sawtooth roofs—mills, foundries, etc. *Holophane Co., Inc.*

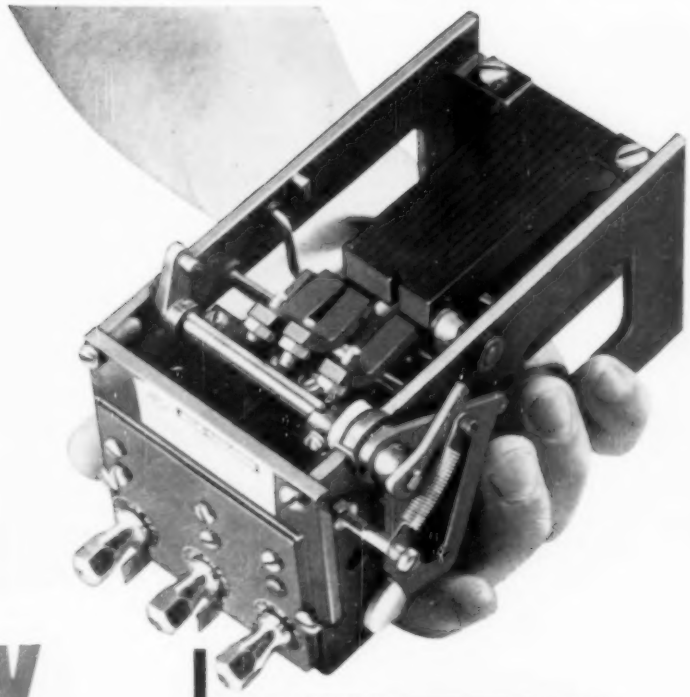


165—Grinding Wheel Salvaging machine allows you to re-size all types of worn grinding wheels in your own plant for further productive use. Machine can re-establish wheel's bore in 20 min. Handles wheels from 8 to 42 in. dia., up to 14 in. thick. *Wickes Corp.*

166—Electronic Air Cleaners with charcoal filters remove dirt particles down to 0.001 micron size, thus permit air re-use and cut fresh air intake 25% in air conditioning systems. Four models; 10,000 cfm. model costs about $3,100. *Minneapolis-Honeywell Regulator Co.*

Turn the page

ALLIS-CHALMERS
low voltage
switchgear



Here's

Proven Accuracy

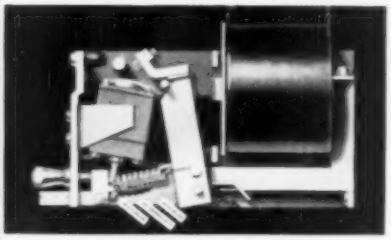
3 independent elements available in series trip device

This time-proven feature of Allis-Chalmers low voltage switchgear provides:

- **Accurate settings** — Adjusting knobs with calibration scales on front of trip device permit operator to adjust elements independently and set pickup for long time (80-160%), short time (500-1000%), and instantaneous (500-1500%).
- **Accurate action** — Silicone oil-filled, positive displacement time-delay device is completely calibrated and sealed under vacuum.
- **Accurate adjustment** — Minimum, maximum and intermediate time-delay band settings are field adjustable for each pickup value for fine selectivity.
- **Accurate indication** — Overcurrent trip flag to indicate phase which caused tripping of breaker is available.

Each trip element has its own armature and each armature acts directly on trip block. Accurate trip device is only one feature of Allis-Chalmers low voltage switchgear. For complete details, call an A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Operator inserting circuit breaker using positive-position pantograph. Note trip device accessibility, dead-front breaker, and drawout interlock.



Cutaway shows arrangement of components in Allis-Chalmers direct-acting series trip device. Note calibration scale below adjusting knobs and time band setting on armature extension.

A-5553

ALLIS-CHALMERS

For more facts circle 562 on Reader Service Card

Send a TRUCKSTER instead of a Truck!

Cushman 780 TRUCKSTER®

Here's the machine, already proven in hundreds of factories, that can cut your intra-plant and inter-plant light hauling costs to a bare minimum.

Ruggedly built and driven by the powerful Cushman Husky engine, the Cushman 780 Truckster handles an 800 pound payload with ease. It not only operates at a cost of less than a penny per mile, but requires a minimum of maintenance expense.

The 780 Truckster can save man-hours, too, by converting a "walking" supervisory job into a "riding" job. And it can be used to carry personnel. Highly maneuverable, it requires only a 50-inch passageway.

The 780 Truckster is available with fiber glass cab and side curtains as optional equipment, and in a wide variety of body styles to fit your specific needs. Electric starter also available.

CUSHMAN MODEL 731 ELECTRIC TRUCKSTER

A two-passenger machine with quarter-ton payload capacity. Operates silently and efficiently at a cost of pennies per day. Goes anywhere—inter-plant or intra-plant; requires only a 40-inch passageway.

Ask your dealer for a FREE demonstration or write for new booklet

SOLD AND SERVICED NATIONALLY

Replacement parts immediately available

CUSHMAN MOTOR WORKS, INC.

A subsidiary of Outboard Marine Corporation
956 No. 21st, Lincoln, Nebr.

Please send complete information on 780 Truckster

NAME _____

ADDRESS _____

CITY _____ STATE _____

FACTORY / EQUIPMENT NEWS

Begins on page 140

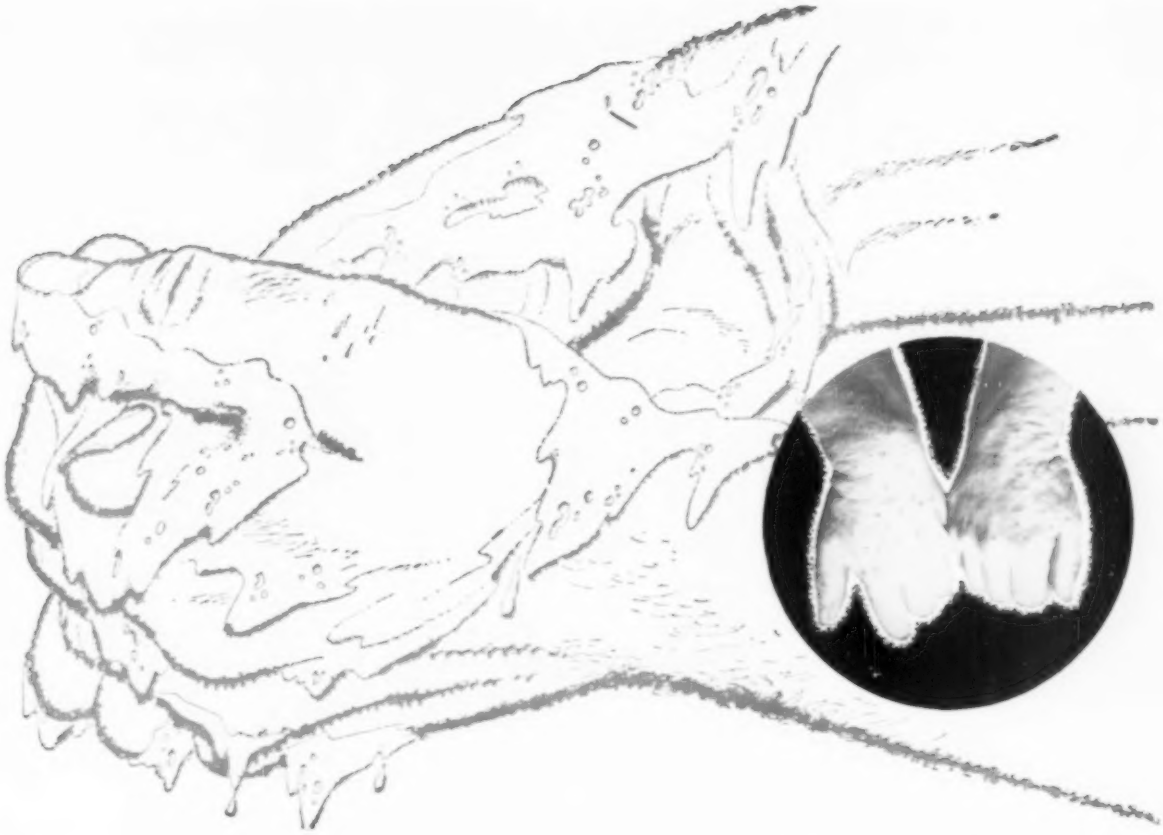
For more about these items, circle item numbers on Reader Service Card next to back cover.

167—Electric Soldering Iron, in response to pull on trigger, feeds solder from a spool through a guide tube to tip of the iron. Each throw-away spool holds about 1/8 lb. of solder. Iron weighs 6 1/2 oz., allows precision soldering with one hand. *Atlas Mfg. Co., Inc.*

168—Safety-Brake Winch gives operator complete control of a load through the handle. Simply turn handle clockwise to raise load, counterclockwise to lower; stop, and brake automatically holds. Brake has "off" position for spooling line from winch. *The Fulton Co.*

169—Casters for light-duty equipment have formed steel thread guards to keep string, dirt, and water out of bearings and axle; also have grease-sealed swivel and wheel bearings. They're available with 5- or 6-in.-dia. semi-pneumatic rubber tires. *Faultless Caster Co.*

Turn the page



How cleanliness prevents **DERMATITIS**

Cleanliness removes the cause of dermatitis — prevents prolonged contact with chemicals, oils, abrasive dust and other skin hazards.

The preventive cure?

Prompt efficient cleansing in combination with safety aids that prevent contact. This simple concept is the basis for the highly successful West Program of Dermatitis Prevention and Control.

How does it work?

No contributing source of dermatitis is overlooked. Specially formulated hand cleaners insure safe, effective cleansing. Antiseptic protective creams help protect exposed skin areas. "Vinylite" aprons and armguards prevent clothing contamination. Other specialties protect against bacterial infections.

The West Program of Dermatitis Prevention and Control is an inexpensive way to eliminate the needless penalties and costs of dermatitis. Why not discuss it with one of our specialists? His recommendations will be tailored to your needs. Just send the coupon. Or call your local West Office.

Programs and Specialties for Preventive Maintenance and Protective Sanitation

WEST CHEMICAL PRODUCTS INC.

WEST DISINFECTING DIVISION

WEST CHEMICAL PRODUCTS INC., 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Casgrain Ave., Montreal

☐ Please send your 24 page booklet, "The Control of Dermatitis in Industry."
☐ Please have a West Representative telephone for an appointment.

Name_____

Position_____

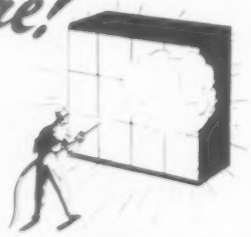
Mail this coupon with your letterhead to Dept. 14

For more facts circle 564 on Reader Service Card

Large fire losses are the highest ever, with a resulting toll of suffering and dollars, according to the National Board of Fire Underwriters. Experts blame lack of effective fire stop materials and partitions in structures as a serious contributing factor. Give your property the *extra proven protection* of wire glass. Mississippi Wire Glass, approved Fire Retardant #32, tends to bottle up fire . . . helps prevent it from roaring into a costly conflagration. For positive protection that no glass substitute can offer, insist on Mississippi Wire Glass—the original upon which the Underwriters standard was based in 1899—the standard today by which all others are judged.

Trial by Fire!

In this dramatic Underwriters Laboratory test, the glass is first subjected to temperatures ranging up to 1600° F., and later to a ¾" stream from a fire hose at 35 to 40 lbs. pressure. Passing the test requires that glass remain in sash, unchanged except for cracking due to thermal shock.



Insist on WIRE GLASS *for Glazing*

. . . in skylights, windows, partitions, doors and wherever else fire or breakage protection is needed.

Send for free catalog 58-I. Address Department 11.

MISSISSIPPI GLASS COMPANY
88 Angelica St. • St. Louis 7, Missouri
NEW YORK • CHICAGO • FULLERTON, CALIFORNIA

FACTORY / EQUIPMENT NEWS

Begins on page 140

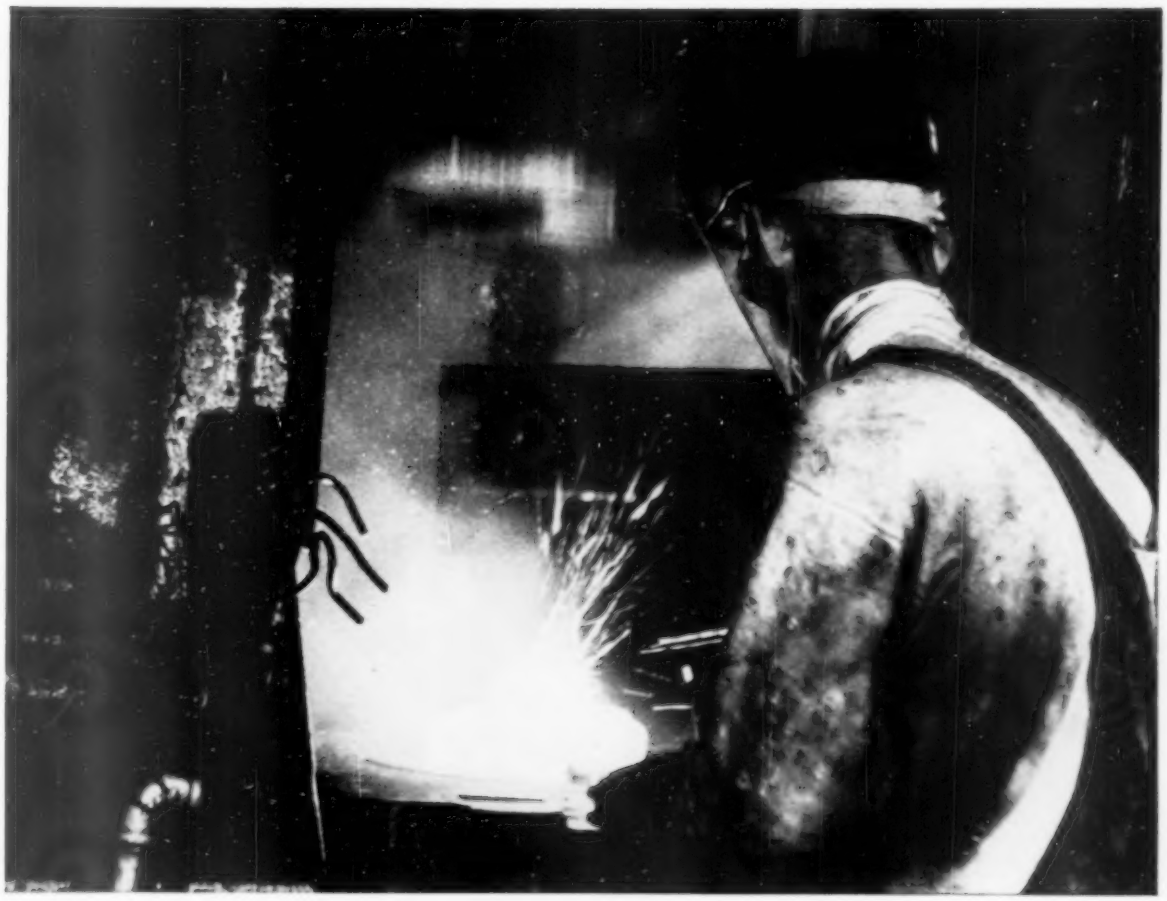
For more about these items, circle item numbers on Reader Service Card next to back cover.

170—Heavy-Duty Turntables, capacities to 10,000 lb., can be used individually or inserted in conveyor lines. Underside of table has a turned raceway to permit easy rolling of top deck; spring-loaded stops can be supplied at 90- or 180-deg. points. *Sage Equipment Co.*

171—Circuit Breaker Enclosures in 15- to 800-amp. ratings are offered in flush and surface mountings for either external handle-operation or handle-through-cover operation. Line includes general-purpose, water-tight, and dust-tight units. *General Electric Co.*

172—Heating and Ventilating units in new line provide broad capacity coverage with 11 sizes, 600 to 66,000 cfm. Components and accessories are constructed to mount quickly and easily, one to the other, for flexible combinations and arrangements. *American Blower Div.*

Turn the page



Interstate Drop Forge Company—

20 Years a Cities Service Customer and Still Forging Ahead!

The modern way to cut a die is typified by die sinking machine, one of many at Interstate Drop Forge Company. All die sinking machines are lubricated by Cities Service lubricants.

With production running at roughly 1000 tons per month, Interstate Drop Forge Company of Milwaukee is one of the largest forging concerns in the Wisconsin area and growing all the time.

An integral part of this growth story, Cities Service is proud to have filled Interstate's lubrication needs for the past 20 years.

Drop hammers . . . helve hammers . . . upsetters . . . forging rolls . . . shapers . . . automatic metal saws. These are but a few of the diversified machines lubricated by specially tailored Cities Service oils and greases.

Actually, in a plant of this type with so many differing pieces of machinery, it would be possible to have as many as 25 different lubricants. But, Interstate, with the aid of their Cities Service Lubrication Engineer has been able to standardize on twelve Cities Service lubricants.

Streamlining . . . standardizing . . . improving. These are some of the services a Cities Service Lubrication Engineer can render for your operation, too. Ask him to make a free lubrication survey of your plant. Call the nearest Cities Service office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

For more facts circle 566 on Reader Service Card

EASY to start with...

It's no "big deal" to start using Du Mont Industrial Television in your operation. A camera and monitor is all you need, at a cost as low as $2000.

And, you can add to the system as needs arise — all Du Mont Industrial Television equipment is designed for future expansion — start now and grow later with Du Mont!

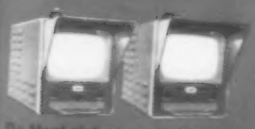
Du Mont Industrial Television is demonstrated, sold and serviced by local, competent contractors in all parts of the country.

EASY to grow with...

Add remote camera control at any time. Permits side-to-side, up-and-down camera movement, and lens change from a remote location.

Add extra cameras as you need them. Du Mont offers a choice of two basic cameras to better fill your exact requirements.

And as your system grows, Du Mont central control equipment can provide complete, supervisory control over the entire system from a single location.



Du Mont picture monitors may be added as needed. Du Mont manufactures a complete line of monitors in screen sizes from 8" to 27".

DU MONT®

IT CLOSED CIRCUIT

INDUSTRIAL TELEVISION

Industrial Television Division FMM4
Allen B. Du Mont Laboratories, Inc.
Clifton, N. J.

☐ Please send complete information on Du Mont Industrial Television.
☐ Please arrange a demonstration at my convenience.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____

For more facts circle 567 on Reader Service Card

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

173—Roto-Edge Cutter is a semi-portable, compressed-air-powered machine for deburring and trimming straight-edged work pieces of varied materials—metals, plastics, rubber, laminates, etc. Pressure on the pedal causes rapid 8-in. downward stroke of cutter head and disk. *American Machine & Foundry Co.*

174—"Automex" is a new experimenting device designed to optimize yields in automation of processing industries. It coordinates the set points of a number of controllable factors to optimize the yield or profit from a process—just as an experienced operator does. *Westinghouse Electric Corp.*

Turn the page

51 1952 1953 1954 1955 1956 1957

Eye Accidents Cut 83½%, 38 Eyes Saved, $324,500 Saved

...another answer to "Does Eye Protection Pay Off?"

Norton Company, world's largest manufacturer of abrasives, established in 1951 a complete, compulsory eye protection program covering about 2,200 employees working in eye hazardous areas.

What are the results? Mr. Nelson P. Ingalls, Safety Engineer, estimates that on a conservative basis: (1) 38 employees today have their sight (in one or both eyes) who otherwise would have lost it (2) $43,500 has been saved in medical expense (3) $281,000 has been saved in compensation. Sufficient savings to pay for 11 years of their *entire* safety program. Medical cases have been cut 93% since 1951 and medical costs 97%.

Norton Company's experience is typical. In metalworking, the chemical industry, transportation, woodworking — wherever workers are exposed to eye hazardous operations, it pays to install an eye protection program. Yes, and *quality* protective equipment such as American Optical safety products, featuring *safety standard frames and lenses* fitted to the job and the worker, is basic.

NOTE: The laws of Massachusetts specify that for the total loss of use of both eyes, twenty dollars per week shall be paid *in addition to all other* compensation, for 500 weeks. For the loss of one eye, twenty dollars per week for 200 weeks.

Always insist on the trademark on lenses and frames.

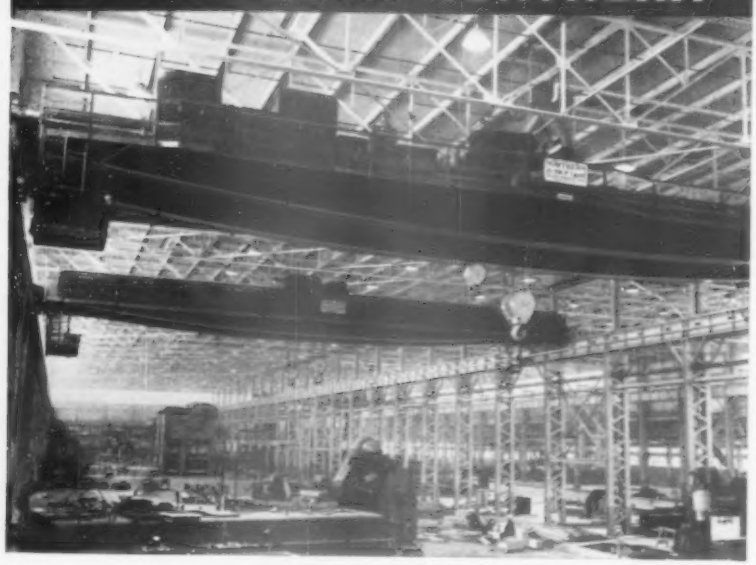
American Optical COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS
Branches in Principal Cities

1833-1958 • 125 LEADERSHIP YEARS

For more facts circle 568 on Reader Service Card

Look Overhead... see "NORTHERN"



these notable twins assure dependability

LOCATION Press bay of a large, new plant manufacturing rear axle parts and components for automobiles and trucks.

SPAN 96 feet 10 inches, centers of runways.

CAPACITY 30-tons on Main Hooks, 10-tons on auxiliary hooks.

ELECTRICAL EQUIPMENT 60-HP motors on Main Hoist, Auxiliary Hoist and Bridge Travel, and 15-HP motor on Trolley Travel, with full magnetic control and direct current on brakes.

ADVANTAGES These twin NORTHERN cranes serve twin heavy press lines located at each end of the press bay. Designed for heavy duty requirements with compensating type bridge end trucks, and equally suitable electrical equipment and controls, they dependably and safely speed machinery installation or relocation, and assure smooth, uninterrupted flow of work in today's and tomorrow's automated production.

Let us explore similar possibilities in your plant

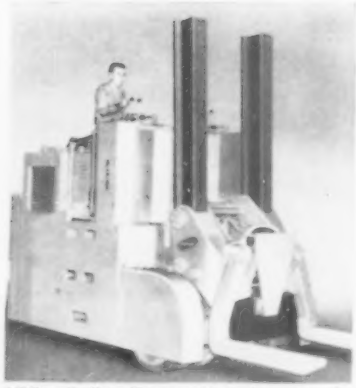
NORTHERN MATERIAL HANDLING EQUIPMENT

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.



175—Split Ram Attachment for maker's fork and ram trucks can handle steel coils and other cylindrical objects, two at a time; also adapts for handling loads on pallets or skids. Hydraulic-operated; allows good visibility for operator. *Elwell-Parker Electric Co.*

176—Powder-Actuated Studgun drives all sizes of pins by use of three quickly interchangeable barrels; handles all types of fastening jobs—light, medium, and heavy. Safety guard prevents firing unless tool is pressed firmly against work surface. *Ammo Products, Inc.*

177—Keyless Chuck for portable drills is built on "ball bearing screw" principle—mechanic can tighten or loosen it merely by turning up the barrel of the chuck with his finger. No lost keys. And chuck won't jam or loosen during drilling. *Supreme Products Corp.*

Turn the page

For more facts circle 569 on Reader Service Card

For more facts circle 570 on Reader Service Card ➤

"Take a tip from me—

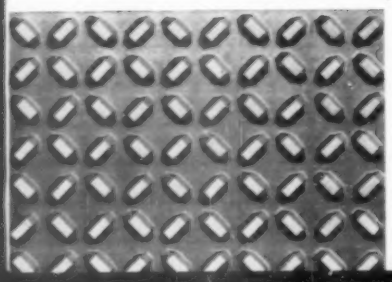
One slip can cost more than USS Multigrip"

Have you safe-treaded *all* the danger spots in your plant and on your moving equipment? Accidents may be costly—but they can be prevented. The safe tread offered by USS Multigrip Floor Plate provides positive traction in any direction.

Multigrip is studded with hundreds of little cleats shaped like those on a football player's shoe. They are flat on top—comfortable to walk on—and safe, wet or dry.

Not only does Multigrip protect workers, but it protects floor surfaces, too. It is rugged, heavy-duty steel plate that will last for years with no maintenance. It's easy to keep clean. A quick "once over" with broom or hose will get it spick and span; there are no closed pockets to hold dirt, and water drains quickly in any direction. Get Multigrip from our local distributor near you.

USS and Multigrip are registered trademarks.



Sold by leading distributors from coast to coast

United States Steel Corporation–Pittsburgh
Tennessee Coal & Iron–Fairfield, Alabama
Columbia-Geneva Steel–San Francisco
United States Steel Supply–Warehouse Distributors
United States Steel Export Company

USS United States Steel

BLUE BLAZES Synthetic Cleaner now activated with HCP!

BLUE BLAZES, the powerful synthetic cleaner, has been made *even more powerful* by the addition of HCP. The HCP ingredient activates BLUE BLAZES to provide *instant penetrating action*.

How does it work? BLUE BLAZES, with HCP, immediately attacks dirt, oils, and any other foreign material that may be on your floor.

It penetrates grime, surrounds the particles, lifts them off the floor, and holds them in suspension until removed with a wet pickup vacuum, squeegee, or mop.

As gentle as rain water. It's completely safe, too. Though it overpowers dirt and grime in an instant, BLUE BLAZES with HCP is *chemically neutral* (pH of 7 in solution).

Non-Ionic. Because it is completely non-ionic, BLUE BLAZES with HCP can pick up both positive and negative charged dirt particles. Also, it leaves no film or other residue that would help create static charges which attract and hold dirt particles to the floor.

Works in hard water or soft. BLUE BLAZES with HCP works in any kind of water . . . cold or hot, hard or soft. This makes it ideal for all phases of floor maintenance.

Because BLUE BLAZES is a free rinsing cleaner, no hard water scum or soap residue is left behind to dull the beauty of your floors.

You have to see it to believe it! Ask your local MULTI-CLEAN man to demonstrate how quickly BLUE BLAZES with HCP will clean your dirtiest floor. You'll be under no obligation whatsoever.

MULTI®-CLEAN *Method*

The combination of the right Multi-Clean Equipment and Materials with the correct procedure.

MULTI-CLEAN PRODUCTS, INC., Dept. FM-30-48
2277 Ford Parkway, St. Paul 16, Minnesota

☐ I'd like to see for myself what BLUE BLAZES with HCP can do for my floors. I understand demonstration will be free and I'll be under no obligation.

Send information on care of: ☐ Concrete, ☐ Wood, ☐ Asphalt Tile, ☐ Terrazzo, or ☐ _____ floors.

Name _____ Title _____

_____

Address _____

City _____ Zone ____ State _____

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

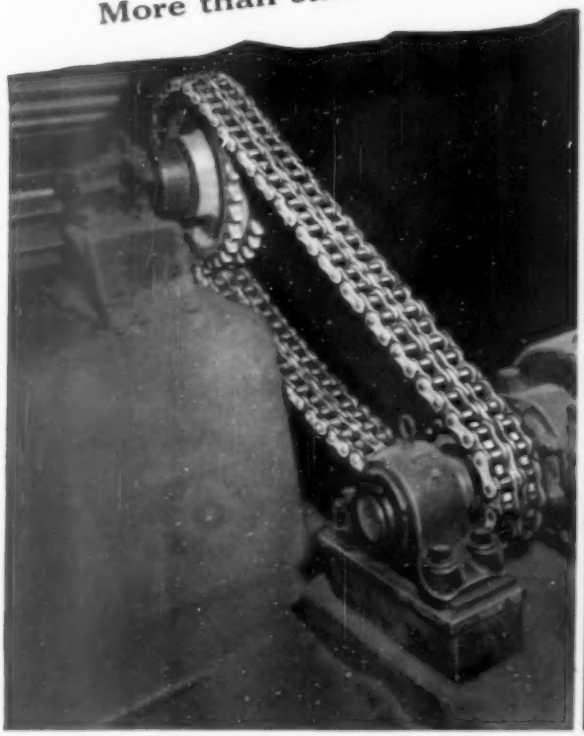
178—Hydraulic Hand Lift Truck is a lightweight, multiple-stroke model with a 48-in. platform. Weighs under 250 lb., handles skid loads to 2500 lb. The conveniently placed lift pedal turns in a 190-deg. arc along with the steering wheel. *Barrett-Cravens Co.*

179—Chromplater is a completely packaged chrome-plating unit for odd jobs in production and plant maintenance. It applies a hard plate with low heat and friction; deposits 0.0001-0.010 in. of chrome on all types of worn metal parts. Price: $975. *The Dawson Corp.*

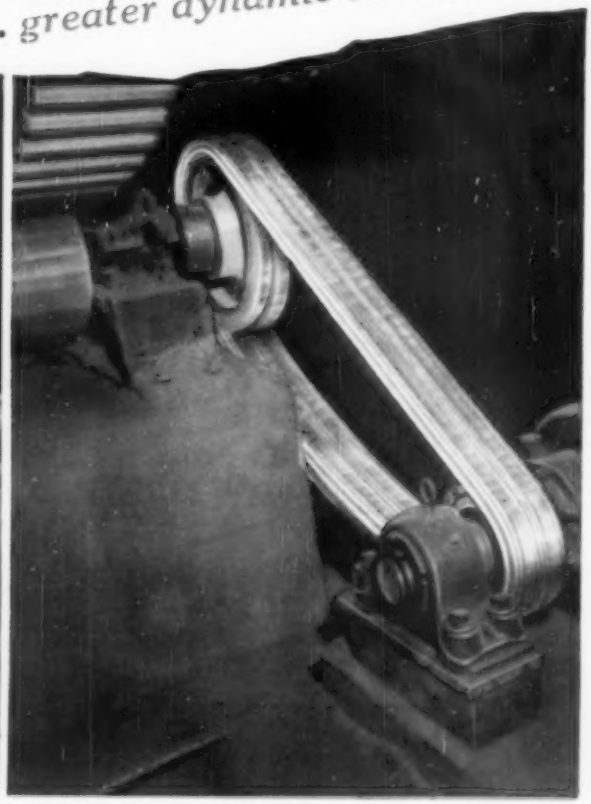
180—Lo-Line Cooling Towers, in capacities from 75 tons up, are designed to conform to metropolitan fire codes. All-steel structurals are hot-dipped after fabrication. For fire safety, louvers, casing, and other vital parts are of asbestos cement. *J. F. Pritchard & Co.*

Turn the page

More than static strength . . . *greater dynamic strength!*



RESISTANCE TO TENSILE STRESS is achieved with properly heat-treated, accurately machined side bars made of premium steel and fitted with properly hardened pins, bushings, rollers.



STRENGTH OF CHAIN IN MOTION results from such refinements as pitch-hole preparation, micro-finish of parts, special processing of side bars, pre-lubrication, rigid quality control from materials selection to final boxing.

Big reason for the extra life from LINK-BELT roller chain

STARTING shock, heavy loads and impact of sprocket engagement on modern heavy-duty machinery requires a chain that will resist fatigue. That's why Link-Belt gives you *greater dynamic strength* to shrug off stresses. Pre-stressing, closer heat-treat control, lock-type bushings, shot-peened rollers—all these Link-Belt refinements contribute extra stamina for extra life . . . provide smoother, more efficient chain performance . . . reduce drive and conveying costs.

You have a choice of single- or double-pitch, single- or multiple-width chain. See your Link-Belt office or authorized stock-carrying distributor for facts.

LINK-BELT

ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

For more facts circle 572 on Reader Service Card

an adams report *NO. 2 OF A SERIES*

RECIRCULATION MAY BE KEY TO FUTURE GROWTH OF CHEMICAL AND INDUSTRIAL PROCESSES

How much water do you need to make: a ton of steel? a ton of synthetic rubber? a ton of bromine? a barrel of beer?

These are not empty questions. They point to a critical problem which confronts management today in its plans for tomorrow. It is more critical than most of us realize... for industry today uses as much water as all other users.

Industry's Needs in 1975

Water is vital for chemical and industrial growth. By 1975, industry will require 215 billions of gallons daily. That is a 100% increase over our current industrial consumption... more than we currently consume for all uses combined.

Competing for this water will be irrigation farmers and the general public. Their combined needs by 1975 will be up 40 billion gallons a day... possibly even more.

What is the Supply Picture

More than 40% of the communities in the United States already have a critical water supply problem. Yet, to meet the 1975 needs, our supply must be expanded by 50%, at an estimated cost of $50 billion.

Indications are that industry is going to have to bear its part of this cost. Certain communities are already moving to place flat water rates on all users... regardless of the volume used. Other groups are demanding a national water policy with full Federal Government regulation of natural sources.

Chemical Industry's Stake

Shortage of water can be a most serious threat to the expansion hopes of the chemical industry. A glance at the following table shows why. You need approximately:

20,800 tons of water per ton of	Bromine
2,500 " " " " " "	Synthetic rubber
830 " " " " " "	Viscose rayon
300 " " " " " "	Newsprint
208 " " " " " "	Smokeless powder
15 " " " " " "	Coke from coal

While process refinements may be able to reduce slightly the amount of water needed for each product, the gains will be minor.

Difference Between Use and Consumption

This is best illustrated by the water needed to make a ton of steel. The industrial average is 65,000 gallons (271 tons). In the past, 65,000 gallons of water flowed out of a river through the steel mill and back into the river again for each ton of steel made. In this case, use and consumption are one and the same thing.

On the west coast, a large steel mill now requires only 1,100 gallons of makeup for each ton of steel produced. This steel mill has its own recirculation system which holds several million gallons of water.

This water is recirculated at a rate equal to 65,000 gallons per ton of steel produced. The only water consumed is that lost due to evaporation or through leakage. Thus, net consumption has been reduced to 1,100 gallons.

Two Bulletins Available

One of the most important pieces of equipment in a recirculation system is a filter. Where high quality process water is needed, diatomite filters will provide an effluent second only to distilled water. Bulletin 651, released by the R. P. Adams Company, Inc., 515 E. Park Drive, Buffalo 17, N.Y., covers this type of industrial water filter.

A second publication, Bulletin 909, covers an Automatic Water Filter which is frequently used in recirculation systems where the water is used for less critical applications. This bulletin is also available on request from the R. P. Adams Company at the above address.

By the way, it takes almost two tons of water to brew a barrel of beer.

CONSERVE WATER, OUR MOST VALUABLE NATURAL RESOURCE

R. P. ADAMS COMPANY, INC.
515 E. PARK DRIVE
BUFFALO 17, NEW YORK

A-58

We have a problem involving liquid filtration. Ask your local representative to call on us.

Name_____ Title_____
Company_____
Street_____
City_____ State_____

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

181—Electronic Stethoscope is a handy battery-powered transistor tool for inspecting machinery. "Detectoscope" picks up slightest vibrations in working machinery and amplifies them electronically so that internal operation can be diagnosed. *Valley Engineering Corp.*

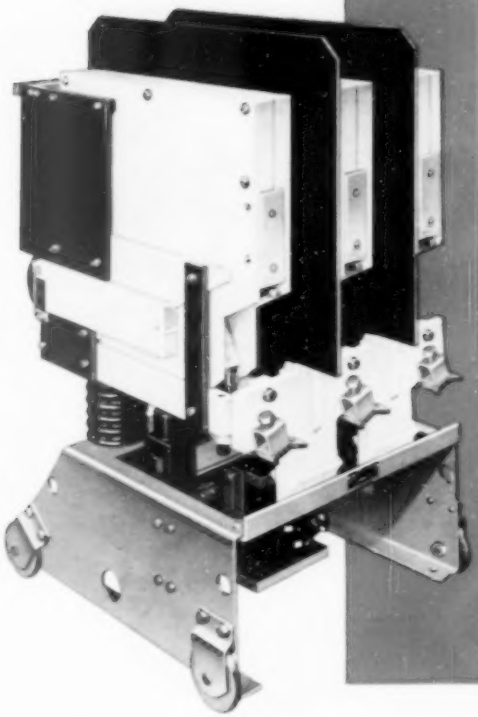
182—Fork Lift Truck with 30,000-lb. capacity is built for heavy-duty handling of materials in unpaved yard areas and plants. Forks can be extended hydraulically 4 ft. forward at any height, and can be tilted independently of the mast. *Pettibone Mulliken Corp.*

183—"Quiet Channel" selective device assures private two-way radio communications by blocking out unwanted messages on shared systems. Device triggers only the particular receiver to which message is directed, silences all others within range. *Radio Corp. of America.*

Turn the page

For more facts circle 573 on Reader Service Card

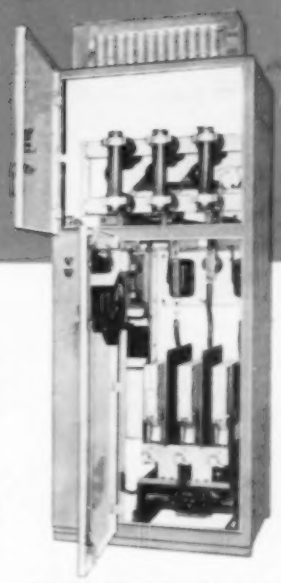
For more facts circle 574 on Reader Service Card ➤



Air break starters

for high voltage motors

A-B QUALITY



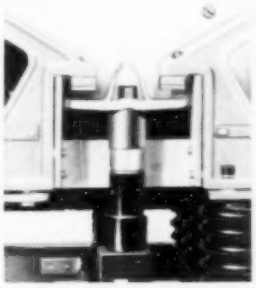
Bulletin 966 high voltage air break, across-the-line synchronous motor starter in NEMA Type 1 enclosure.

This *new* air break contactor—around which Allen-Bradley has developed a complete line of high voltage starters—is designed to match your *toughest* applications. It features the same solenoid design—with only *one* moving part—that has made Allen-Bradley low voltage starters universally recognized for their tremendous operating life.

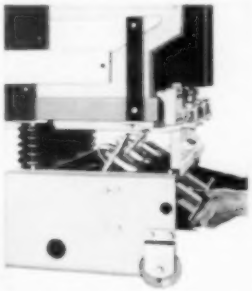
These new contactors are available in full voltage and reduced voltage starters—nonreversing or reversing—for squirrel cage, part winding, slip ring, and synchronous motors up to 1500 hp. 2300 volts; 2500 hp. 4600 volts. All starters are equipped with current limiting fuses and have an interrupting capacity of 150,000 kva at 2300 volts and 250,000 kva at 4600 volts.

It will pay you to investigate these *quality* starters. Complete information is contained in Publication 6080 . . . please send for your copy, today.

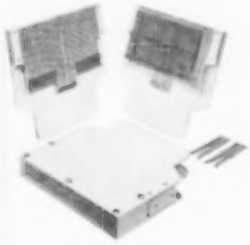
Only One Moving Part. Simple solenoid design eliminates trouble-causing pins, pivots, and flexible jumpers.



Double Break Contacts of silver alloy never need maintenance. Vertical motion assures uniform contact pressures.



Easy Access from Front. Crossbar and contacts removable from front, without special tools, for easy inspection.



Faster Arc Suppression. New blowout design and novel arc chute. Chutes are molded from an arc resistant material.

Allen-Bradley Co.
1316 S. Second St.
Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd.
Galt, Ontario

3-58-MR

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

Husky

BULLETIN 801

LIMIT SWITCHES

IN A THOUSAND AND ONE TYPES

From among the hundreds of Allen-Bradley Bulletin 801 general purpose limit switches, you're sure to find your exact requirements. There are 21 different contact arrangements available, including types with single or multiple poles, N.O. and N.C. contacts, spring return or maintained contacts, with either a slow or snap action mechanism. It will pay you to know this *quality* line of limit switches. If you do not already know this quality line, let's get acquainted. Write for the complete story.

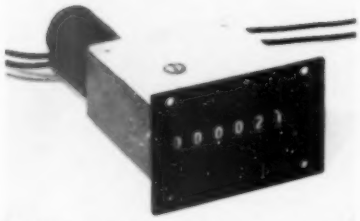
Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

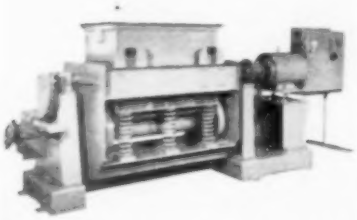
S-58-MR

Begins on page 140

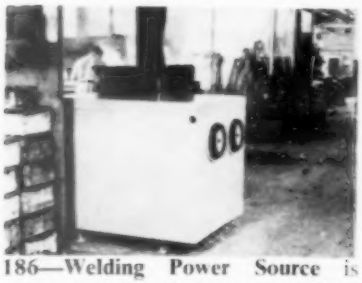
For more about these items, circle item numbers on Reader Service Card next to back cover.



184—Electrical Counters for use in data processing and other applications feature high speed, long life, instant re-set, large figures, and small panel size. Rated speed is 3,000 counts per min.; counter life is said to exceed 200 million counts. *Veeder-Root, Inc.*



185—Vibrator, employing principle of controlled vibration, is said to do anything a tumbling barrel will do —up to 100 times as fast. Unit permits flexibility in vibrational frequencies and amplitudes; handles coarse work or fine finishes. *Lord Chemical Corp.*



186—Welding Power Source is economical for 10 or more welding arcs. Available in 750- or 1500-amp. d-c ratings, the high efficiency source can be used with series resistance grids to accommodate arc, stud, or inert arc welding in any combination. *A. O. Smith Corp.*

Turn the page

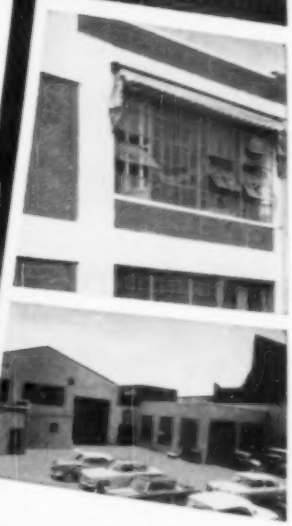
RE-NEW-COAT Resurfaces, Protects and Decorates Masonry Buildings In One Application!

Re-New-Coat, with an outstanding record of performance even under severe conditions, actually anchors itself into masonry surfaces and becomes part of the structure itself. It is resistant to alkali, acid fumes, smokes, gases and other corrosive factors. Remarkable adhesive qualities of Re-New-Coat, due to presence of Devran Epoxy Resin, insure a firm tight bond to masonry.

ECONOMY — Because of the several mil thickness of dense structurally strong coating, built with only one application, there is no need for a second time-consuming application.

LONG LIFE PROTECTION — Prolonged protection against surface erosion is just one of the beneficial characteristics inherent in Re-New-Coat.

WEATHER PROTECTION — Masonry structures subjected to constant erosion caused by driving rains and chemical fumes common to industrial areas are effectively protected for years to come.



TRUSCON "RE-NEW-COAT" with Devran Epoxy Resin actually extends the life of your buildings!

FIELD DEMONSTRATION

Ask for field demonstration in one or more of the attractive colors available!

TRUSCON
Laboratories
Industrial Maintenance
Division of Devoe & Raynolds Co., Inc.,
Detroit 11, Michigan

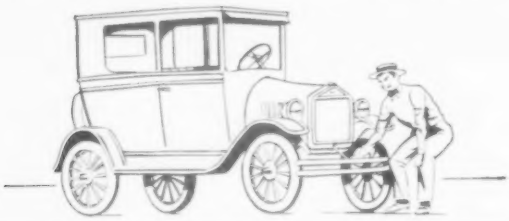
TRUSCON Laboratories
Dept. J-9, 1700 Caniff
Detroit 11, Michigan

☐ Have field engineer call for appointment.
☐ Send more information on RE-NEW-COAT at once.

Name _____
Company _____
Address _____
City _____ Zone ____ State _____

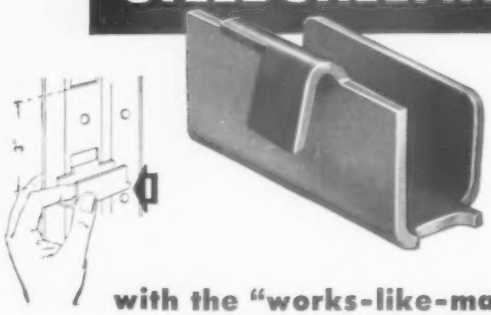
For more facts circle 576 on Reader Service Card

bolts and nuts for steel shelving are as out of date as the model "T"



"go modern" with

BORROUGHS STEEL SHELVING



with the "works-like-magic" shelf support bracket

And here's all you do . . . just insert the shelf support brackets into slots in the posts . . . (no fumbling or dilly-dallying with studs, bolts, nuts, tricky tools or lock washers) . . . next you tilt one end of shelf into support brackets and lower the other end . . . it takes but seconds, and shelf is ready for loading. Another feature of Borroughs Steel Shelving is that each unit is complete in itself. No part depends on unit next to it. Any unit or shelf can be moved independently.

and as new as a new day's sun Borroughs Steel Shop Equipment

Sturdy — functional — good looking — quality built and economically priced. Line includes work benches, portable and semi-portable units, utility carts, tool stands, shop desks and table. Designed to meet your most exacting needs and pocketbook.

send for catalog

BORROUGHS MANUFACTURING COMPANY OF KALAMAZOO

A SUBSIDIARY OF THE AMERICAN METAL PRODUCTS COMPANY OF DETROIT

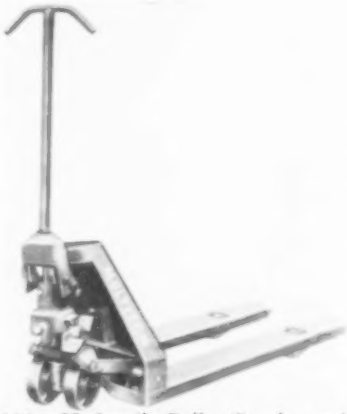
3020 NORTH BURDICK ST. amp® KALAMAZOO, MICHIGAN

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

187—Mercury Vapor Fixture, explosion-proof Type EVA, is particularly suited for high-bay applications. The fixture will take 250-watt Type BT-28 and 400-watt Type BT-37 mercury vapor lamps. Standard 300-500 watt-size EV reflectors are used. *Crouse-Hinds Co.*



188—Hydraulic Pallet Truck, made in West Germany, is available in the following capacities and U.S.A. prices: 2200 lb., $358; 3500 lb., $383; 4400 lb., $409. It has a lift of 4 1/3 in., comes in a variety of fork lengths. *Stokvis-Edera & Co.*

189—Centrifugal Pump of the volute type can be horizontally or vertically installed in hot-water or chilled-water systems; has many supply system applications such as cooling towers. Thirteen sizes from 1/3 to 2 hp., capacities to 150 gpm. *Dunham-Bush, Inc.*

Turn the page

For more facts circle 577 on Reader Service Card

For more facts circle 578 on Reader Service Card ➤

Shutdowns for lubrication cut in half with

RYKON

Grease

Dollars in production time saved by using RYKON in high temperature service at Northwestern Steel & Wire Company

Bearings on the 46-inch blooming mill manipulator and side guard carrier had to be lubricated twice each eight-hour shift before RYKON Grease was used. The mill had to be shut down while the lubrication work was performed. Now with RYKON, the bearings are greased once each shift. Maintenance men find rollers and pins are still well lubricated. The rollers are subject to almost constant heat and water washing. Steel blooms heated to approximately 2300° F. are just 18 inches away from the RYKON lubricated bearings. The lubricating properties of the grease are unaffected by the heat.

RYKON Grease delivers similar performance results elsewhere in the plant. In roller bearings on the reheating furnace charging tables, in pinch roll bearings and in other trouble spots, where heat and continuous water washing would make short work of other greases, RYKON stands up to the test.

A unique nonsoap, organic thickening agent gives RYKON Grease the ability to provide lubrication in tough-to-lubricate spots long after other greases have failed. This thickener is the result of five years of research effort by a Standard Oil grease research team working to develop an outstanding industrial grease. RYKON Grease is a true multipurpose grease capable of performing all lubrication jobs on one piece of equipment or often in an entire plant.

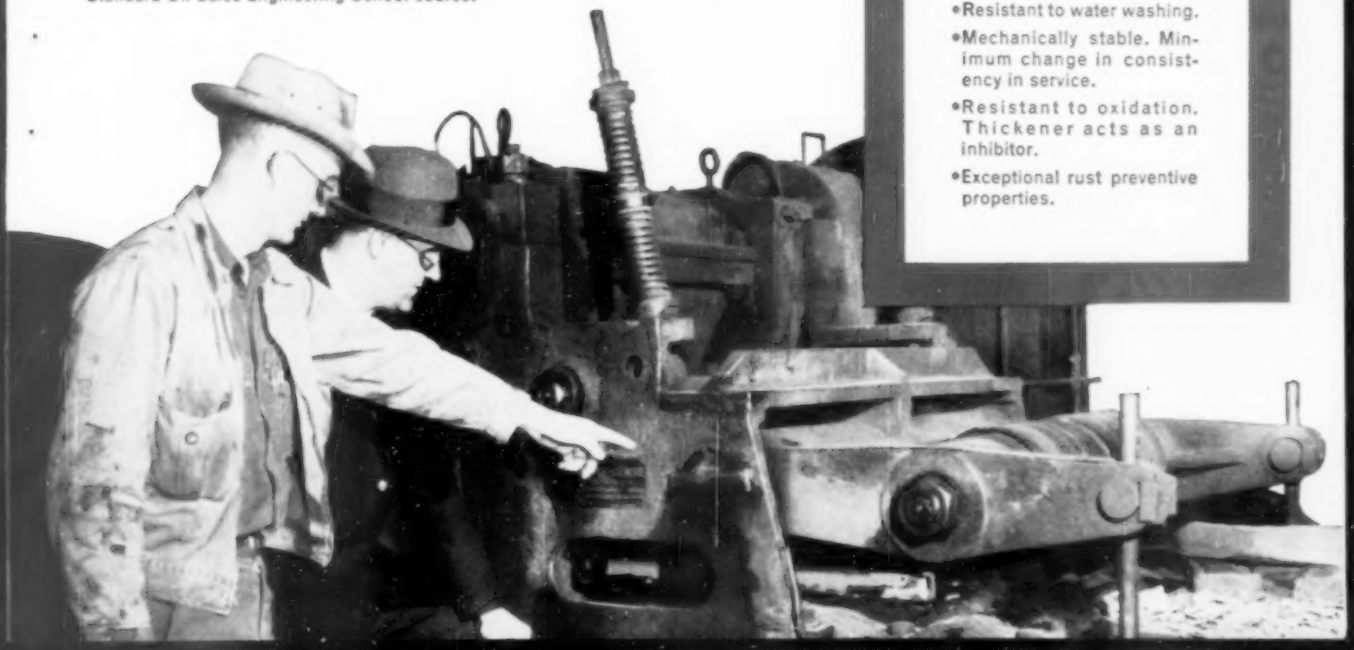
More facts about RYKON Grease are available from the Standard Oil lubrication specialist that is near you in any of the 15 Midwest and Rocky Mountain states. Call him. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

You expect more from **STANDARD** and get it!

Lubrication time cut. Mill feeder pinch roll bearings formerly lubricated twice each eight hours. Now with RYKON Grease, lubrication is needed only once each shift. Elbert Dean, Northwestern Steel lubrication engineer, and Standard Oil lubrication specialist, Charles Daub, inspect bearings. Counseling people who have lubrication jobs like this is work for which Chuck Daub is well-qualified. Chuck has 12 years' experience in lubrication technical service work. He has an engineering degree from Illinois Institute of Technology and has completed the fifteen week Standard Oil Sales Engineering School course.

Quick facts about
RYKON Grease

- Stable at high temperatures. At sustained high temperatures RYKON Grease remains soft and grease-like.
- Resistant to water washing.
- Mechanically stable. Minimum change in consistency in service.
- Resistant to oxidation. Thickener acts as an inhibitor.
- Exceptional rust preventive properties.



What's the best way to heat a tank?

Your Chromalox man has the **ANSWER**

Trying to heat a tank with steam or combustible fuels often presents rough problems, costs needless time and money and leads to ineffective results. But 97 times out of 100 there is a quick and effective electric answer—and your "CHROMALOX man with the answers" has it. Here, for example, are five ways of heating a tank—each presenting significant advantages, and using stock industrial heaters in most instances.

- In the foreground, CHROMALOX Strip Heaters are clamped to the tank wall, heating by conduction, without contacting the tank contents. Tank interiors have full work space—cleaning is simplified.
- Moving clockwise: CHROMALOX Screw-Plug-Immersion Heaters, with standard pipe threads, go to work quickly in heating water and corrosive solutions. Heavy-duty elements of steel, copper, stainless steel, or alloy, all in correct watt density, have proper chemical characteristics.
- Next: Portable Tank Immersion Heaters require no tank openings. They put the heat down to the very bottom of the tank—and they are constructed for trouble-free life with moisture, heat, and acid-resistant parts and joints.
- Next: Coiled over-the-side heaters, for full but shallow tanks, produce good circulation and uniform temperatures. Various sheaths resist practically all chemicals.
- Next, at right front: a High-capacity Flange-Type Heater packs many kilowatts in a small space, particularly in water solutions. The heavy-duty flange simplifies installation.

So what's YOUR heating problem? Just call your CHROMALOX representative, listed opposite. He has the fast, clean, safe, accurate, economical ELECTRICAL ANSWER, backed by the world's largest stock of industrial electric heaters for immediate shipment, plus factory design engineering services.

2640-A

CHROMALOX® Electric Heat

Edwin L. Wiegand Company

7518 Thomas Boulevard, Pittsburgh 8, Pennsylvania • CHurchill 2-6400

Call Chromalox

for the man with the
ELECTRICAL ANSWERS
to your heating problems

ATLANTA 9, GA.
Applebee-Church, Inc.
1389 Peachtree St. N.E.
TRinity 5-7244

BALA-CYNWYD, PA.
J. V. Calhoun Co.
349 Montgomery Ave.
MOhawk 4-6113

BALTIMORE 18, MD.
Paul B. Renoff Co.
333 E. 25th St.
HOpkins 7-3280

BINGHAMTON, N. Y.
R. P. Smith Co., Inc.
2507 James Street
Phone 4-7703

BLOOMFIELD, N. J.
R. L. Faber & Associates, Inc.
1246 Broad Street
EDison 8-6900

BOSTON 11, MASS.
Leo C. Pelkus and Co., Inc.
683 Atlantic Ave.
LIberty 2-1941

BUFFALO 2, N. Y.
Niagara Electric Sales Co.
525 Delaware Avenue
SUmmer 4000

CHARLOTTE 2, N. C.
Ranson, Wallace & Co.
116½ East Fourth St.
EDison 4-4244
FRanklin 5-1044

CHATTANOOGA 1, TENN.
H. R. Miles and Associates
P. O. Box 172
Phone 5-3862

CHICAGO 5, ILL.
Fred I. Tourtelot Co.
407 S. Dearborn Street
HArrison 7-5507

CINCINNATI 8, OHIO
The Smyser Company
1046 Delta Avenue
TRinity 1-0605

CLEARWATER, FLA.
J. J. Gallener
617 Cleveland Street
P. O. Box 1376
Phone 3-7706

CLEVELAND 13, OHIO
Anderson-Bolds, Inc.
2012 W. 25th Street
PRospect 1-7112

DALLAS 26, TEXAS
L. R. Ward Company
3009-11 Canton Street
RIverside 1-6279

DAVENPORT, IOWA
Volco Company
215 Kahl Bldg.
Phone: 3-2144

DENVER 2, COLO.
E. & M. Equipment Co.
2415 15th Street
GLendale 5-3651
GEnesee 3-0821

DES MOINES 14, IOWA
Midwest Equip. Co. of Iowa
842 Fifth Avenue
CHerry 3-1203

DETROIT 38, MICH.
Carman Adams, Inc.
15760 James Couzens Hwy.
UNiversity 3-9100

HOUSTON 3, TEXAS
L. R. Ward Company
3605 Polk Avenue
CApitol 5-0356

INDIANAPOLIS 4, IND.
Couchman-Conant, Inc.
627-631 Architects & Builders Bldg.
MElrose 5-5313

KANSAS CITY 6, MO.
Fraser D. Moore Co.
106 E. 14th Street
VIctor 2-3306

LOS ANGELES 15, CALIF.
Montgomery Brothers
1053 South Olive Street
Richmond 7-9401

MIDDLETOWN, CONN.
Dittman and Greer, Inc.
33 Pleasant Street
DIamond 6-9606

MILWAUKEE 3, WIS.
Gordon Hatch Co., Inc.
531 W. Wisconsin Avenue
BRoadway 1-3021

MINNEAPOLIS 4, MINN.
Volco Company
831 South Sixth Street
FEderal 6-3373

NASHVILLE 4, TENN.
H. R. Miles and Associates
2500-B Franklin Road
CYpress 2-7016

NEW YORK CITY, N. Y.
See "Bloomfield, N. J."
WOrth 4-2990

OMAHA 2, NEB.
Midwest Equipment Co. of Omaha
3614 Izard Street
ATlantic 7600

PHILADELPHIA, PA.
See "Bala-Cynwyd, Pa."
GReenwood 3-4477

PITTSBURGH 6, PA.
Woessner-McKnight Co.
1310 Highland Bldg.
115 S. Highland Avenue
EMerson 1-2900

PORTLAND 9, ORE.
Montgomery Brothers
1632 N.W. Johnson Street
CApitol 3-4197

RICHMOND 26, VA.
(Branch, Charlotte)
ATlantic 8-8758

ROCHESTER 4, N. Y.
Niagara Electric Sales Co.
133 Clinton Avenue, South
HAmilton 6-2070

ST. LOUIS 1, MO.
C. B. Fall Company
317 N. 11th St., Suite 1001
CHestnut 1-2433

SAN FRANCISCO 3, CALIF.
Montgomery Brothers
1122 Howard Street
UNderhill 1-3527

SEATTLE 4, WASH.
Montgomery Brothers
911 Western Avenue
SEneca 3270

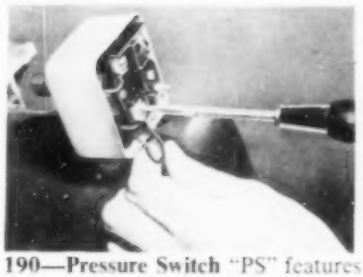
SYRACUSE 6, N. Y.
R. P. Smith Co., Inc.
2507 James Street
HOward 3-2748

WICHITA 2, KANS.
Fraser D. Moore Co.
Room 211 Derby Building
352 N. Broadway
AMherst 2-5647

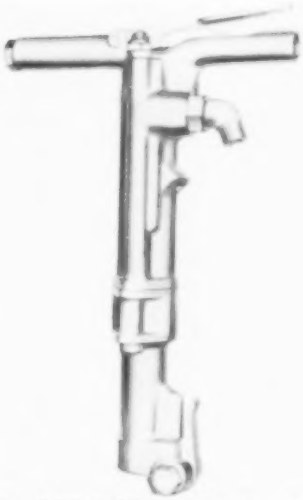
FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.



190—Pressure Switch "PS" features pressure connectors, top-accessible wiring terminals, no-drift pressure settings, and four compact enclosure styles. Switches with 85-lb. maximum capacity are rated to 1 hp., 110-220 v., single- and polyphase. *Furnas Electric Co.*



191—Lightweight Breaker, available with a clay spade handle or a trench digger handle, is easy to hold and operate for light demolition work, digging trenches, etc. The 35-lb. breaker has a latch-type steel retainer. *LeRoi Div., Westinghouse Air Brake Co.*

192—Flexible Coupling, a positive dry coupling that never requires lubrication, is made up of three component parts: a heat- and oil-resistant neoprene sleeve with axially molded internal teeth, and two metal end-fittings with grooves to match teeth. *U. S. Rubber Co.*

Turn the page

"OUR GUARANTEE IS PREDICATED ON THE USE OF LUBRIPLATE LUBRICANTS"

says
AIR CARGO EQUIPMENT CO.
at Glendale, Calif.

Our use of LUBRIPLATE Lubricants exclusively, followed the "torture testing" of our Bulldog Cargo Winch at an Air Force test center. The 196 pound winch, lubricated with LUBRIPLATE, was operated under a six ton load in environments of extreme heat, cold, salt, humidity, dust, altitude, explosive vapor and pressure. Now, our unconditional guarantee is valid only if the LUBRIPLATE Lubricants, factory sealed in our winches, are not replaced by other lubricants.

John J. Terlep, Sales Manager

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose . . . LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

circle 580 on Reader Service Card

NEWS

ABOUT MACHINE MOUNTS

Unisorb offers three cost-saving benefits for installing machines and equipment . . . Legs or framework can be solidly secured to the floor without bolts or lag screws; No danger of machines "walking"; and Up to 85% of transmitted vibration is absorbed.

Precision machines need a special type Unisorb mounting. Centerless Grinder, left, was installed quickly, without bolts or lag screws; Milling machine, right, is mounted on Unisorb LEVEL-RITE MOUNTS for quick, precise level.

Every machine has a vibration "personality". Different machines require different densities. Only Unisorb provides the right density and thickness.

TRY UNISORB ON OUR TRIAL OFFER! Let us send you the right density and thickness for a specific machine. If you're not satisfied, return within 30 days and we'll cancel the invoice. Write or call, today.

UNISORB 207 SOUTH ST. BOSTON, MASS.

Division of The FELTERS Company

Want more information? Send for set of Unisorb "Facts" Books!

Please send me a set of Unisorb "Facts" Books and trial offer request.

Company.....

Name.....

Address.....

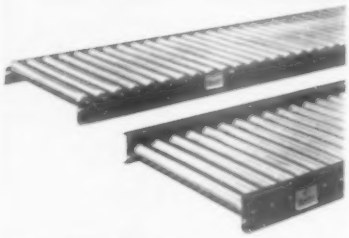
City..... Zone..... State.....

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

193—Laminagage can be used to measure thickness of smooth or rough coatings and platings on base materials. Will measure coating thickness over range of 0.00005-0.007 in. with accuracy of 10%, will detect sub-surface cracks in coatings. *Gulton Industries, Inc.*



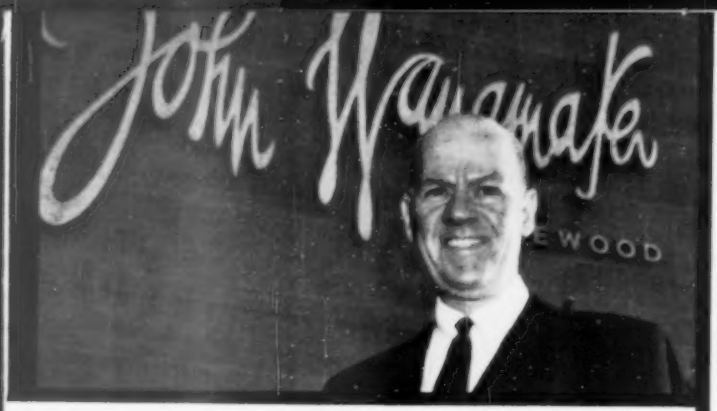
194—Interchangeable Rollers for Rapistan roller conveyors are spring-loaded at one end so they can be installed or removed with a simple punch. These 1.9 in. rollers are available for heavy-, medium-, and light-duty applications. *The Rapids-Standard Co., Inc.*

195—D-C Brake, shunt-wound model, is offered in torque ratings of 10 to 105 ft.-lb., with both standard and dust-tight enclosures. Brake can be floor-mounted for varied industrial applications. Adjustment is easy, using only a screwdriver. *Stearns Electric Corp.*

Turn the page

For more facts circle 581 on Reader Service Card

For more facts circle 582 on Reader Service Card ➤



Mr. Sydney H. Silk, Operating Manager of John Wanamaker's Wynnewood, Pennsylvania, store, says: "Scott worked with our own planning staff while our washrooms were still in the designing stages. These rooms have proved to be very satisfactory for our needs—and our employees like them!"

This washroom incorporates many of the sound principles of Scott's Washroom Advisory Service: recessed wall receptacles, off-the-floor equipment, recessed lighting, easy-to-maintain tile walls and floor, proper traffic flow from washbowls to towels to exit doors. Such efficient facilities will, over the coming years, pay for themselves!

Female employees enjoy a well-planned combination lounge-locker-washroom—and this one serves about 150 people without crowding. Wanamaker had several excellent reasons for calling on Scott: (1) the firm uses Scott products in all stores, (2) knew that Scott has serviced over half-a-million washrooms, (3) is always concerned with employee comfort and happiness, and felt that Scott had the answers.

another case of modern, cheerful, efficient washrooms . . . with the help of Scott's Washroom Advisory Service!

There's no charge or obligation when you call on Scott's Washroom Advisory Service. Find out about it. Get Scott's free booklet on the subject of washrooms . . . complete with illustrations, diagrams, ideas. Mail the coupon today!

SEE SCOTT'S 14-MINUTE FILM ON WASHROOM PLANNING!
(It offers many "quick change" ideas too—to save you money, boost efficiency now!)

Scott Paper Company
Department F-84
Chester, Pennsylvania

☐ Please rush me the free booklet on Scott's Washroom Advisory Service

☐ Please let me know how to see the Scott film

Name _____

Title _____

Company _____

Address _____

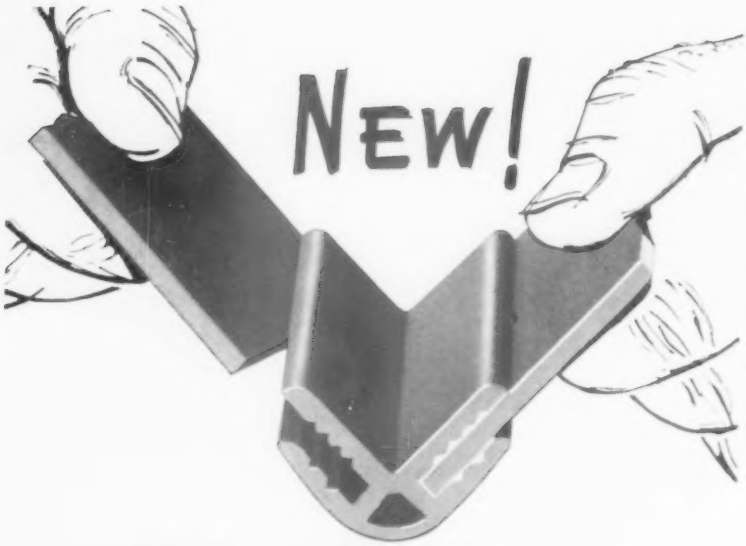
City _____ Zone ____ State _____

SCOTT PAPER WASHROOM ADVISORY SERVICE®

See "Father Knows Best" on NBC-TV!

For information on Scott recessed cabinets, write: D. J. Alexander Corporation, 2944 East Venango Street, Philadelphia 34, Pa.

SP-0111



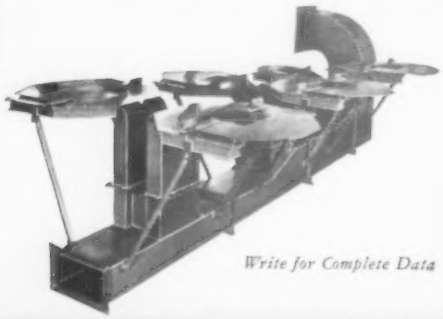
Van-Cor

90 and H Joining Strips

Revolutionary Method of Connecting PVC Sheet Stock—Van-Cor 90 and H joining strips use solvent welding to obtain maximum joint efficiency. They save time and money compared with hot air welding. Skilled welders are unnecessary—your own men can fabricate readily. On major installations using these Van-Cor strips, job costs have been cut over 30%!

Two Shapes—Three Sizes—Use 90 degree joining strips for making corners, H strips in a single plane. They handle sheet in 1/8", 3/16" and 1/4" gauges. Both shapes available in Van-Cor 1 (normal impact) and Van-Cor 2 (high impact). Standard strip length is 10 feet.

For flanges and stiffeners of fabricated sections, extruded structural angles in 10 foot lengths are available in sizes 1½" x 1½" x 3/16" and 2" x 2" x ¼".



Write for Complete Data

INDUSTRIAL DIVISION OF...
COLONIAL PLASTICS MFG. CO.
Subsidiary of THE VAN DORN IRON WORKS CO.
2685 EAST 79TH STREET CLEVELAND 4, OHIO

FACTORY / EQUIPMENT NEWS
Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

196—Quick-Change Frame for use with practically any industrial paint roller comes in widths of 9, 12, 14, and 19 in. Loosening a single wing nut expands the frame, permitting instant roller replacement. The 48-in. handles can be extended up to 23 ft. *Thomas Products Co.*

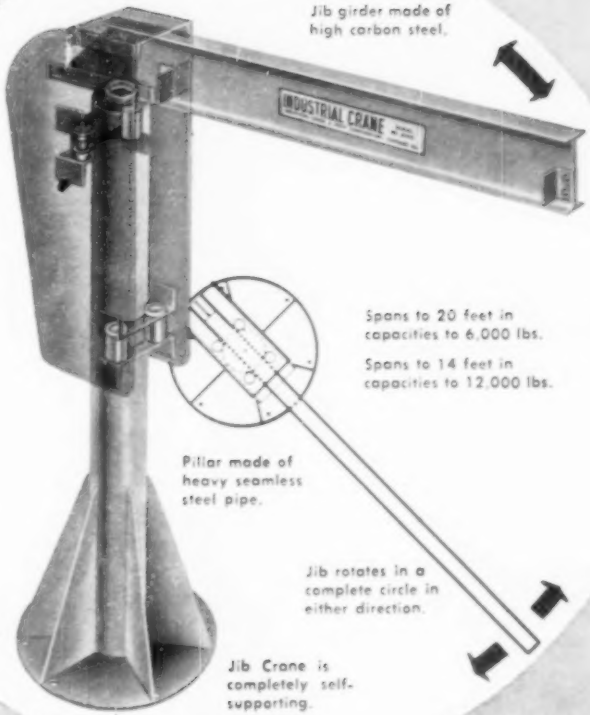
197—Electrisweeper operates a full 8-hr. shift without battery recharge. Features automotive steering, electric forward and reverse control, and a dust system that drops heavier dust before it reaches the filter—thus avoids filter removal. *Wilshire Power Sweeper Co.*

198—TALLescope is the name they've given this telescoping aluminum work platform that reaches to heights of 30 ft. It's lightweight, quickly positioned. It telescopes, folds down to roll through doorways, and legs adjust for uneven floors. *Up-Right Scaffolds.*

Turn the page

Industrial PBM JIB CRANES

Feature Quality Construction



Head Assembly jig-welded for perfect alignment of entire jib.

Jib girder made of high carbon steel.

Head Assembly pivots on heavy ball thrust bearing at top of column.

Head Assembly equipped with 4 large rollers, each containing 2 precision ball bearings. Rollers engage the surface of the vertical column.

Spans to 20 feet in capacities to 6,000 lbs.

Spans to 14 feet in capacities to 12,000 lbs.

Pillar made of heavy seamless steel pipe.

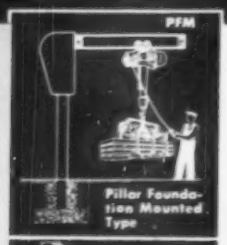
All welded steel construction.

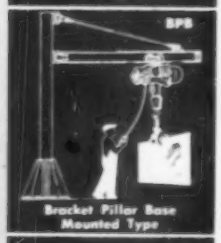
Jib rotates in a complete circle in either direction.

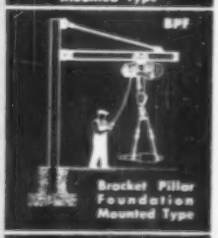
Jib Crane is completely self-supporting.

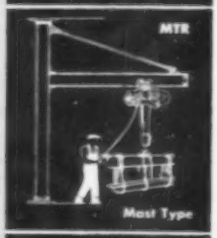
Special designs for larger capacities.

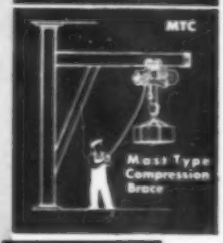
Complete electrification available.











Industrial PBM Jib Cranes are ruggedly built for heavy duty service. Swinging in a complete circle these smooth operating cranes can efficiently serve several machines; freeing the heavy overhead cranes for many other important duties. Study the features of the Industrial PBM — the outstanding Jib Crane in Industry.

Industrial manufactures 6 other types of Jib and many models of Overhead Traveling Cranes to cover every need. Consult with Industrial for cranes to solve your material handling problems.

PBM 559C

Industrial CRANES

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INDUSTRIAL CRANE & HOIST

Industrial PRODUCTS DIVISION

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EXPORT SALES: BORG-WARNER INTERNATIONAL, 36 SOUTH WABASH AVE., CHICAGO, ILLINOIS

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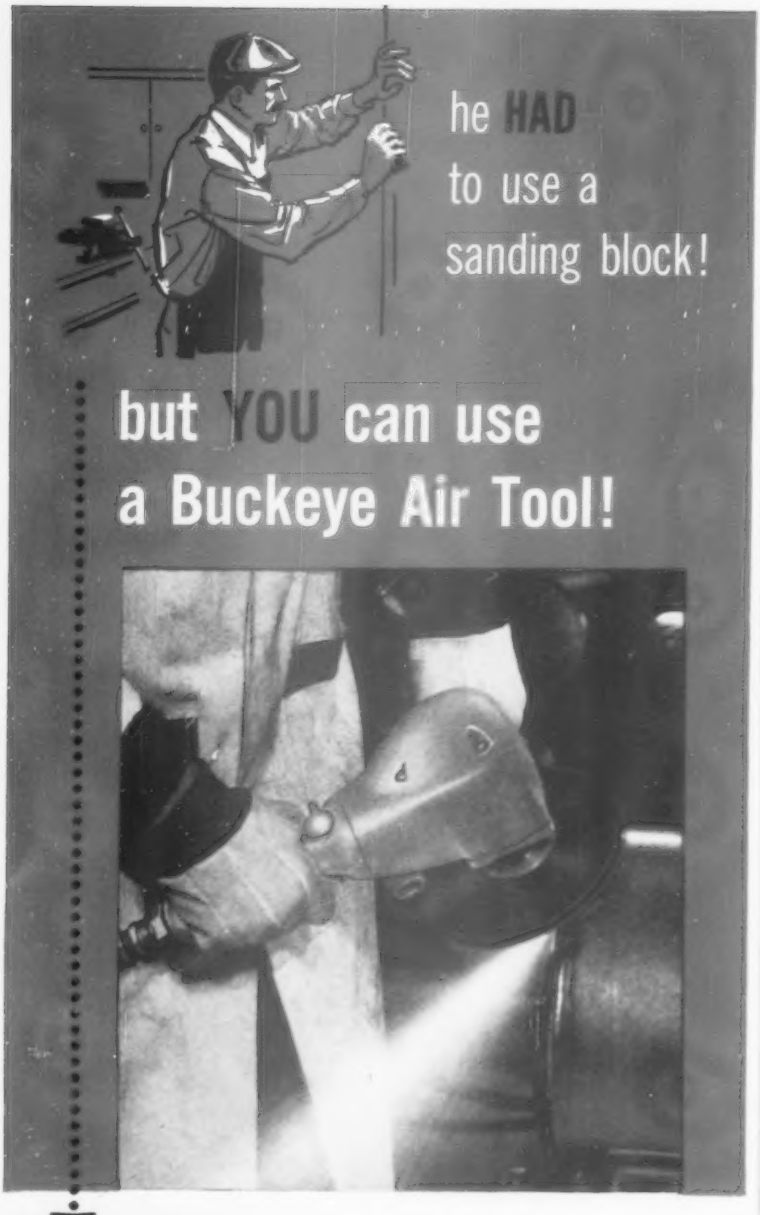


Why AIR Tools?
Because air is everywhere, just waiting to be put to work . . . because continuous operation can't possibly harm an air tool . . . and because, if you're using Buckeye air tools, you can almost forget about tool maintenance.

In Air Tools, Your Best Buy Is Buckeye

There was a time when muscle power—and plenty of it—was needed to finish off a smooth surface. Today, air power, directed through a Buckeye tool, has replaced muscle power. The work gets done faster, naturally . . . and better, of course.

We don't imagine you're still using a wood block and emery cloth, but it's just possible you're not using a modern Buckeye air tool. And that is the only way you can be sure you're doing your finishing work the best and most economical way.

Our Catalog A-10 contains complete information on the entire line of Buckeye abrasive tools, all of it both interesting and helpful to all portable tool users. If you don't have a copy, send us your name, company and address and we'll correct that situation promptly.

Buckeye Tools
CORPORATION
DIVISION 13 • DAYTON 1, OHIO

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

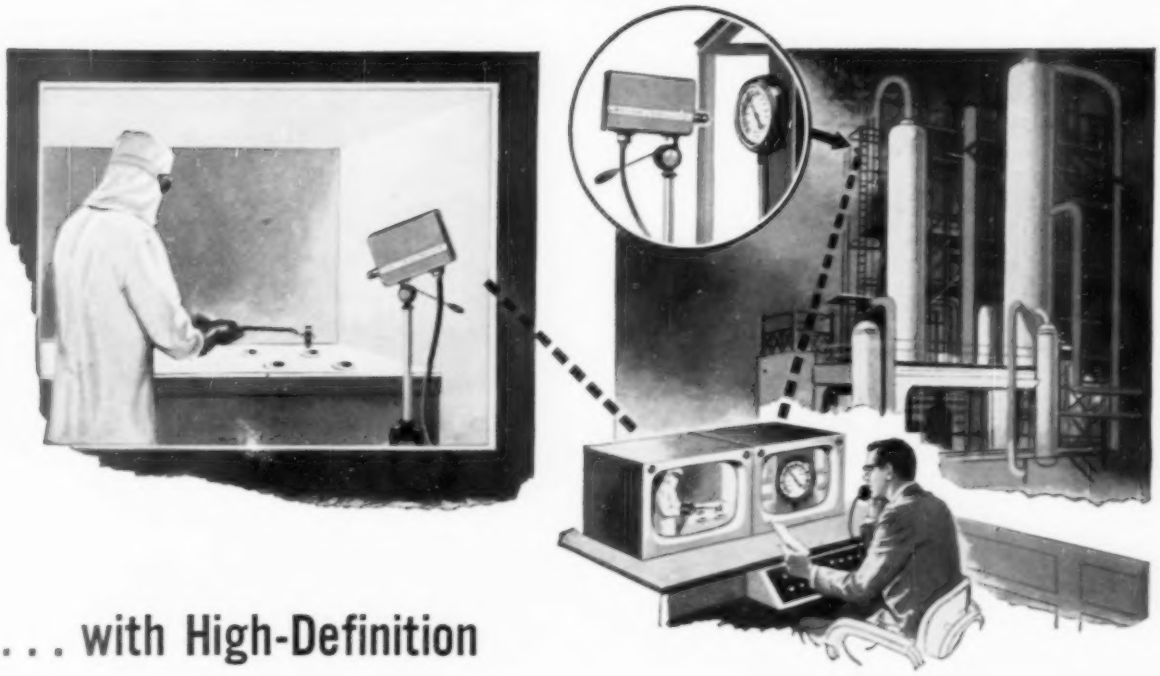
199—Pusher Attachment for maker's 2000- and 3000-lb.-capacity electric fork trucks provides users with benefits of palletless handling. The mechanism unloads packaged or bagged material either from pallets or directly from truck's forks. *Elwell-Parker Electric Co.*

200—Internal Filter Vacuum is a quiet-type cleaner that can be used for wet or dry pick-up. It can be used with 1½- or 2-in. hose and has a top air speed of 375 mph. Its greater air volume is supplied by a 1-hp. motor and new 3-stage fan. *Breuer Electric Mfg. Co.*

201—Press-Action Switch, with thru-connection for easier wiring, is for all a-c applications, particularly large fluorescent installations. "Presswitch" turns on or off with the slightest nudge of the elbow or press of the finger. Available SP, DP, 3- or 4-way. *Harvey Hubbell, Inc.*

Turn the page

View remote or hazardous areas with *SAFETY and ECONOMY*



. . . with High-Definition

PHILCO *Industrial TV*

See where *you* can't be—Now you can maintain constant watch on as many different critical locations as necessary . . . inconvenient gauges and operations, hazards . . . all from one convenient, central control point.

Philco's picture brilliance and accuracy of detail are unsurpassed. Details are sharp and clear. You can actually read gauges and dials at light levels as low as 10 foot candles.

Philco's complete line of ITV accessories extends the use of your basic system and permits maximum flexibility. Remote pan and tilt . . . remote iris and focus . . . Auto-Zoom lenses . . . lens turrets . . . weatherproof housings . . . explosion resistant housings . . . all assure complete versatility and adaptability to any installation through Philco's "building block" techniques.

Your Philco ITV installation gives guaranteed performance because it is a *systems designed* installation . . . "custom-made" by our highly skilled systems engineering group to suit your specific requirements. And, Philco Industrial TV requires very little power . . . total power consumption for an entire system is actually lower than that required to operate a household iron.

For economical and efficient remote visual control . . . specify Philco ITV.

Send for illustrated brochure, describing complete Philco ITV equipment and systems.

At Philco, opportunities are unlimited in electronic and mechanical research and engineering.

PHILCO **Government and Industrial Division, 4702 Wissahickon Avenue**
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For more facts circle 586 on Reader Service Card

A COMPLETE LINE OF GENERAL PURPOSE BELT CONVEYERS engineered and standardized by

MATHEWS

A reversible General Purpose Belt Conveyer serving parallel roller conveyer storage lines.

THESE General Purpose Belt Conveyers are furnished in a wide range of belt widths and section lengths. They can be assembled easily, for all parts are standardized and furnished from stock. The conveyers have several features which make them especially practical for the average package handling problem. The drive unit may be located at the end, or at any convenient point beneath the conveyer. End roller assemblies, takeups, and three-pulley devices are all standardized and easily installed.

Floor and hanger supports have a wide range of adjustment, and are especially convenient in situations where conveyers must be arranged to meet production requirements.

Write for Bulletin G.P.53 and Catalog 856 today.

MATHEWS CONVEYER COMPANY

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MATHEWS

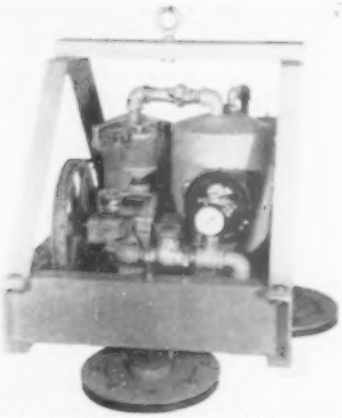
Over Fifty Years of Leadership in Mechanized Handling

FACTORY / EQUIPMENT NEWS

Begins on page 140

For more about these items, circle item numbers on Reader Service Card next to back cover.

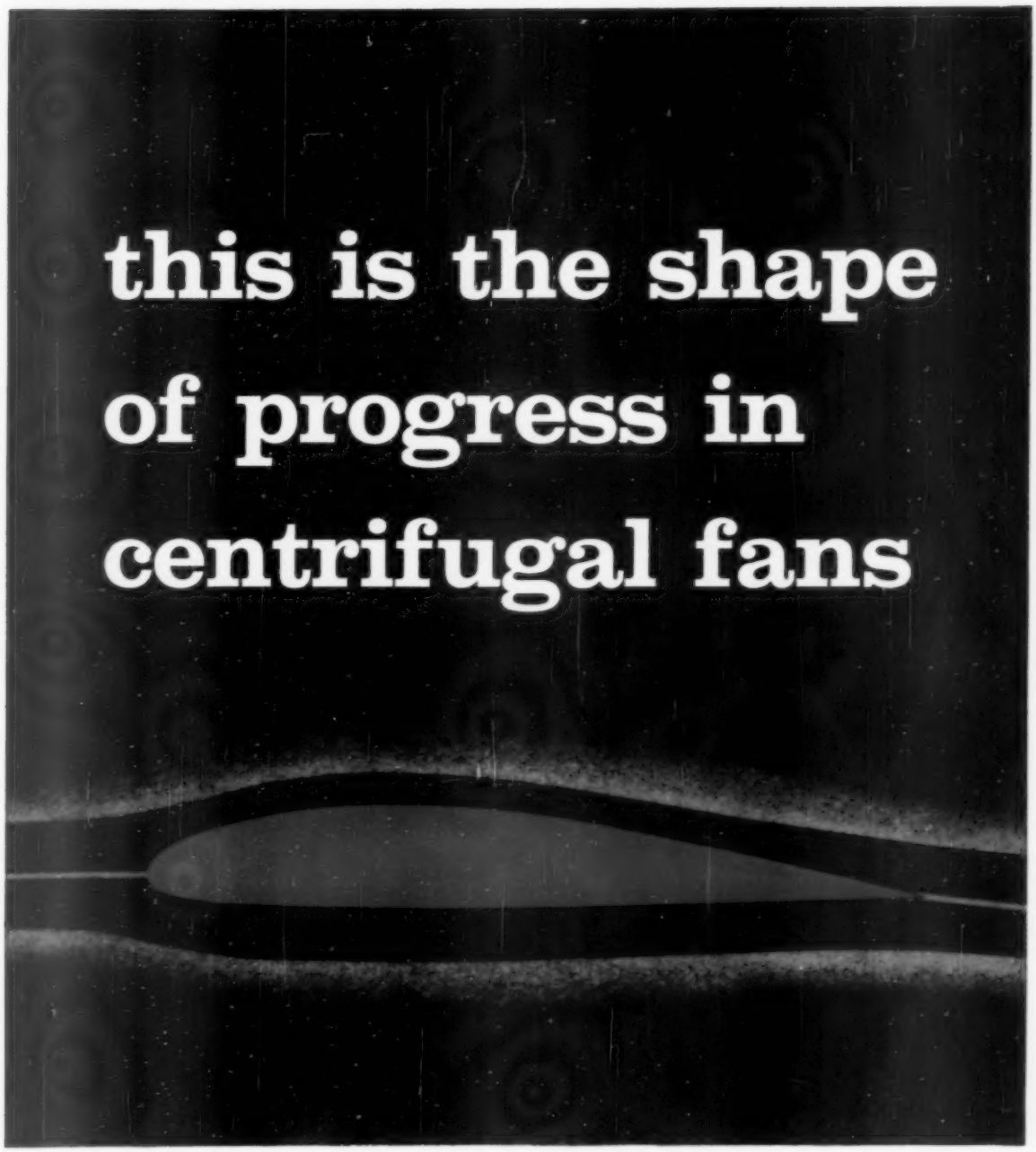
202—Lightweight Plastic Shield permits personnel to observe molten metal or to face other radiant heat above 2000 F. without burns or discomfort. Shatterproof visor has wide use in heat-treat plants, foundries, fire-fighting, and so on. *New York Air Brake Co.*



203—Portable Vacuum Lift, used with overhead crane, handles any size flat sheet of glass, metal, wood—safely hoists weights to 4420 lb. In case of mechanical failure, vacuum is maintained in the system until lift and transfer are completed. *Edward Zibell Co.*

204—Four Spray-Lube Units permit low-cost, compact installations for spraying cutting liquids to lubricate and cool either one or two cutting tools. Liquid reservoir, either 1- or 2-qt. capacity, allows you to observe and control oil flow. *C. A. Norgren Co.*

For more facts circle 587 on Reader Service Card



The Shape of Progress is—AIRFOIL!

Only Westinghouse offers *you* the effectiveness and quietness of Airfoil Blading in a complete line of centrifugal fans sized to AMCA (NAFM) Standards.

Westinghouse offers these *bonus benefits* in capacities up to 700,000 cfm and four AMCA pressure classes up to $16\frac{3}{4}$" pressure:

- **Lowest Operating Cost**
- **Quiet Operation**
- **Capacity Protection**
- **Non-Overloading Power Feature**

To take advantage of this *exclusive* offering, call your nearest Sturtevant Division Sales Engineer, or write Westinghouse Electric Corporation, Department D-5, Hyde Park, Boston 36, Massachusetts.

J-80666

YOU CAN BE SURE...IF IT'S
Westinghouse

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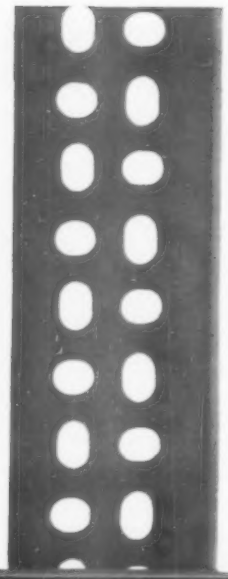
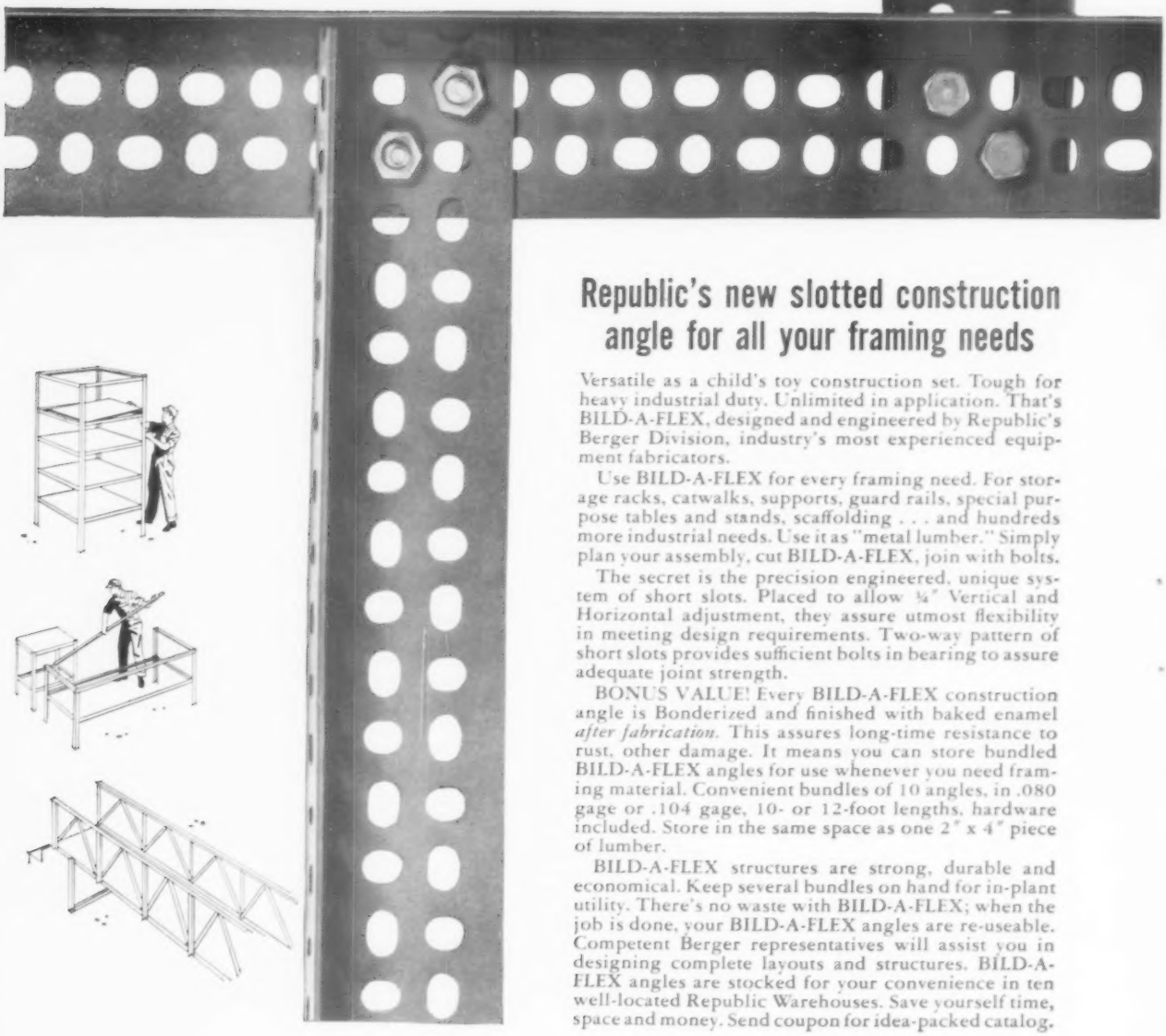
THIS IS BILD-A-FLEX!





Republic's new slotted construction angle for all your framing needs

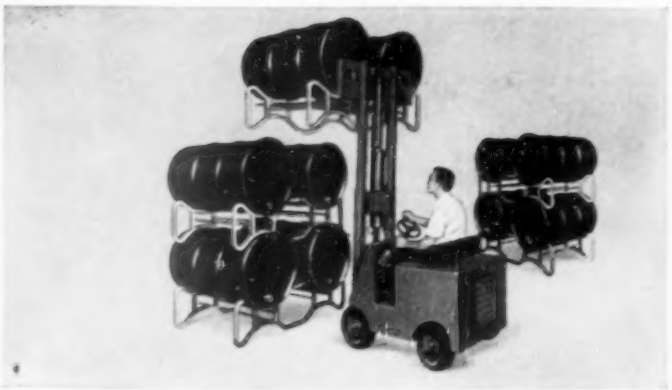
Versatile as a child's toy construction set. Tough for heavy industrial duty. Unlimited in application. That's BILD-A-FLEX, designed and engineered by Republic's Berger Division, industry's most experienced equipment fabricators.

Use BILD-A-FLEX for every framing need. For storage racks, catwalks, supports, guard rails, special purpose tables and stands, scaffolding . . . and hundreds more industrial needs. Use it as "metal lumber." Simply plan your assembly, cut BILD-A-FLEX, join with bolts.

The secret is the precision engineered, unique system of short slots. Placed to allow ¼" Vertical and Horizontal adjustment, they assure utmost flexibility in meeting design requirements. Two-way pattern of short slots provides sufficient bolts in bearing to assure adequate joint strength.

BONUS VALUE! Every BILD-A-FLEX construction angle is Bonderized and finished with baked enamel *after fabrication.* This assures long-time resistance to rust, other damage. It means you can store bundled BILD-A-FLEX angles for use whenever you need framing material. Convenient bundles of 10 angles, in .080 gage or .104 gage, 10- or 12-foot lengths, hardware included. Store in the same space as one 2" x 4" piece of lumber.

BILD-A-FLEX structures are strong, durable and economical. Keep several bundles on hand for in-plant utility. There's no waste with BILD-A-FLEX; when the job is done, your BILD-A-FLEX angles are re-useable. Competent Berger representatives will assist you in designing complete layouts and structures. BILD-A-FLEX angles are stocked for your convenience in ten well-located Republic Warehouses. Save yourself time, space and money. Send coupon for idea-packed catalog.



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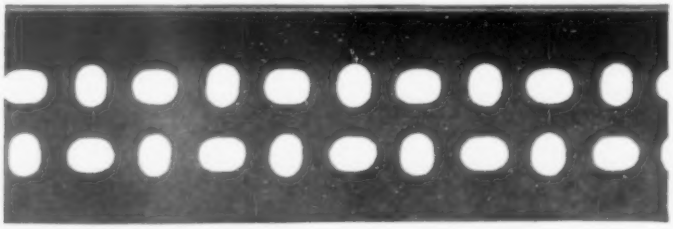

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FACTORY
MANAGEMENT AND MAINTENANCE

LABOR RELATIONS NEWS

By PAUL A. KING, Attorney, Bigelow-Sanford Carpet Company, Inc., Member, New York Bar

Clarifies NLRB Role in Contract Disputes

During union organizing campaigns, the NLRB acts as a policeman. But there are limits as to how far it can swing its club thereafter.

Most plant executives are well aware of the National Labor Relations Board's job during a union campaign to organize a plant. There may be some doubt in their minds as to what action on the part of management constitutes an unfair labor practice, but there is no doubt that the NLRB has a policeman's job here. But a question sometimes arises as to whether the NLRB will play the part of a policeman in enforcing a contract once it is negotiated.

NLRB Member Joseph A. Jenkins did a fine job of classifying NLRB's jurisdiction in a speech made at an arbitration and industrial relations conference in Fort Worth, Tex. Here's what he said:

. . . *One purpose* of the National Labor Relations Act is to encourage collective bargaining by making a refusal to bargain an unfair labor practice.

. . . *The NLRB* was empowered to prevent unfair labor practices. No other law or agreement can interfere with this.

. . . *Its job* is not to enforce union contracts. This is a job for the federal courts in cases involving interstate commerce.

However, in four instances, an attempt is made to involve the NLRB or the Taft-Hartley Act in contract disputes.

1) Rather than follow the contract's grievance procedure, a party may go to the Board for a ruling as to application or interpretation of contract.

2) Or it may take a discharge case directly to the Board.

3) The Board may be asked to order a party to an arbitration to give up its efforts to upset an arbitration award.

4) Or a party may sue under Section 301 (a) of the Taft-Hartley Act to compel compliance with the union contract.

The Board's attitude is:

1) *Application and administration of contracts*: Although it can, the Board will not act where complaint involves a good-faith difference of opinion. Use grievance and arbitration procedures, it says.

2) *Discharge cases*: The Board, as a rule, will leave this to the arbitrator except where (a) there is evidence of collusive-union-company action, (b) unfair representation by a union, (c) the arbitrator applied an invalid clause or rule of law.

3) *Self-help to upset an arbitration award*: Jenkins failed to generalize on this, merely outlined two decisions where the Board found a refusal to bargain. In one case the union struck after an adverse arbitration award without giving the 60-day required notice. In the other, an unfair labor practice was called when the union struck without first resorting to the grievance and arbitration procedure.

4) *Section 301 (a) on suits*: The federal courts will compel specific performance of arbitration clauses. However, many problems of interpretation will arise in the future, Jenkins feels.

For an example, see the following case.

No Injunction for Wildcatters

Management hopes rose high when a federal district court ruled that the company could get an injunction against a strike which violated the contract's no-strike clause. Hopes sunk when, later on, a federal court of appeals reversed this decision. Thus was lost another weapon against the wildcat strike.

The district court said that Section 301 of the Taft-Hartley Act permitted such an injunction. The higher court ruled that if so, it was in conflict with the Norris-LaGuardia anti-injunction law. This latter law would control. Next step—U. S. Supreme Court for a final ruling.

Meantime, still effective are earlier court rulings allowing federal injunction to compel arbitration.

Soft Treatment Before Discharge

Some plant rules carry progressive penalties. Such was the case at Mississippi Time Company. The rule required two hours' advance notice of absence. Penalties were: (1) oral warning, (2) written warning, (3) 5-day layoff, (4) 10-day layoff, (5) discharge. The question: Can an employer skip from the first or intermediate penalty to the last, namely, discharge? The answer: Yes, under some circumstances.

In 1956 this employee had received two written warnings for not giving notice of absence. From November 1956 to March 1957 he was warned orally —several times. On March 14 he received a written warning indicating he'd be fired if it happened again. It did—on March 19 and March 20. He was fired.

The arbitrator went along with the discharge. Here's how he reasoned: A company cannot impose a heavier penalty than prescribed by the rules. But there's nothing

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Begins on page 208

wrong with a company's imposing softer penalties. The company did so in this case several times. The discharge penalty was proper under the progression.

What about the principle to the effect that employees cannot be led to expect soft treatment and then suddenly be pounced upon with discharge? Not applicable here, since the employee had been warned that another offense would result in discharge.

No Solo Talks in Union

There were 2002 employees working at 88 Washington, D.C., drugstores. An election was coming up. Store managers interviewed employees individually and in small groups in the back room and basements of the stores. No promise of benefit was made. Nothing coercive was said. Still, it was unfair labor practice, ruled the National Labor Relations Board.

The Board reasoned: "It is well-established that the technique of calling employees individually or in small groups into a private area removed from the employee's normal work places and urging them to reject the union is in itself conduct which interferes with the condition necessary to a free choice by the employees in the selection of a bargaining representative and warrants setting aside the election."

The employer argued that this was the only way it could bring its message before its employees. The NLRB's answer: "Except during the 24 hours immediately preceding an election, an employer is privileged to call all his employees together for the purpose of speaking to them concerning the election. This the employer could have done on the premises of each of its stores, either during normal working hours or, if that was not feasible, after normal working hours."

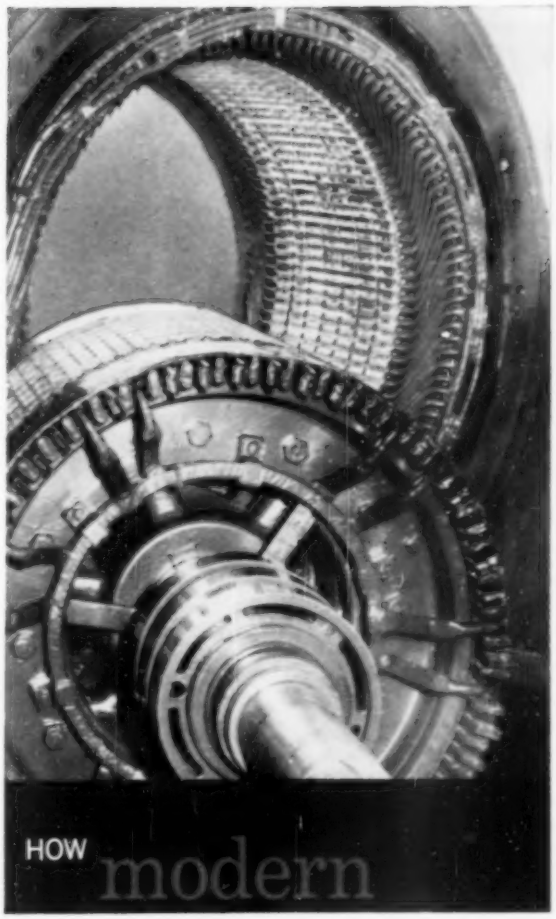
Some members of the Board disagreed with the majority's contention that the rule was well-settled. One dissenter felt this rule was an extension of an already "misshapen . . . doctrine which in recent months has grown from a narrow exception based on unusual circumstances to a broad *per se* rule which, in effect, denies an employer any right to speak to his employees as individuals. It is apparent that . . . the Board is tending to set elections aside not on the basis of what was said, but on the basis of who said it."

This dissension makes sense, doesn't it? But the majority opinion seems to be the law at present.

Pension Plan Work—Who Pays?

When the union and management have finally agreed to the major terms of a union-management welfare fund, they're apt to be so negotiation-weary as to neglect some of the minor, but still important, provisions dollar-wise. One cost consideration we have in mind is who pays for setting up the plan—lawyers, actuary fees, and so on? The union? The company? The plan?

The contract of the Narragansett Brewing Company and United Brewery, Flour, Cereal, Soft Drink and



apparatus repair

STOPPED INSULATION FAILURE

PROBLEM — This 500-hp squirrel-cage motor had been in operation on a rubber mill drive. Records indicated the motor was failing about once a year, due to excessive accumulations of carbon black.

SOLUTION — The stator was rewound with Thermalastic®-insulated coils. The void-free solidity and density of Thermalastic insulation render it impervious to contaminates encountered in industrial service.

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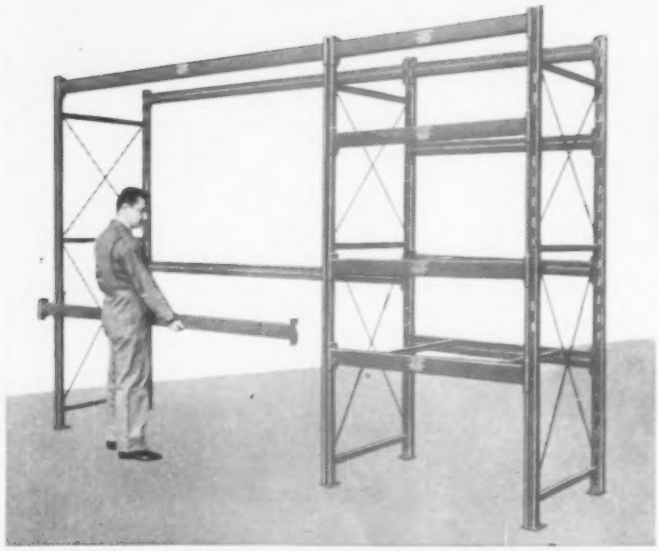

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Begins on page 208

Distillery Workers of America seemed to have worked out this detail satisfactorily—but actually, it wasn't so. The contract stated: "All expenses of the employer and the union incurred in formulating, setting up, and administering the pension plan and fund shall be borne by the pension fund."

A joint committee had been set up to work out details of the plan. But as it turned out, the attorney engaged by the company to help the committee performed much of the work of drafting the documents. This included preparation of the trust document and data needed for obtaining approval of the Bureau of Internal Revenue. In fact, he performed most of the work, getting the plan approved, and so on. When it was all over the company submitted its attorney's bill, listing only those items concerned with setting up the plan. But the union members of the pension committee refused to approve payment on the ground that the attorney had been engaged by management and represented management.

The arbitrator agreed that the attorney's work was essential. That had he never performed it, someone else would have had to. But nevertheless, *advance* approval of such services should have been secured. Any other conclusion might result in either party running up bills for ratification by the joint committee. This would be imprudent administration, ruled the arbitrator, if it were permitted.

The law also states that he who accepts the work of another, even though it was not originally asked for, ought to pay for the reasonable value of the services accepted. Consequently, a much better forum might have been a court of law. That is, the attorney suing the Plan for his fees, with the company guaranteeing payment in the event of failure to collect.

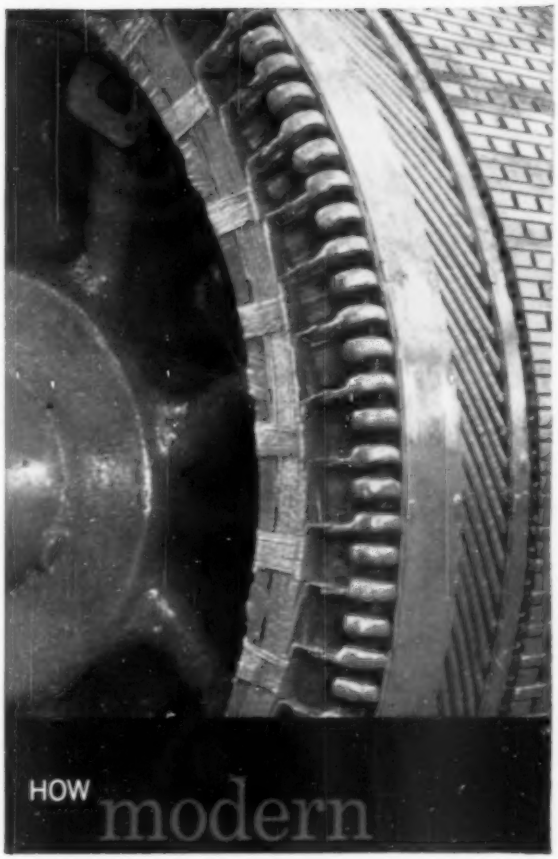
Nevertheless, with this award as warning, employers should make sure that all services rendered a pension plan by its staff or agents is approved of in advance by the pension committee.

Union Harassment Is Unfair

Once in a while collective bargaining becomes a two-way street. That is, what constitutes an unfair employer practice is also an unfair practice if the union does the same thing. Failure to bargain in good faith turned out to be one of those thoroughfares.

Prudential Insurance Company agents who were members of the Insurance Agents International Union (AFL-CIO) refused to write new business, reported in late, contributed only passively at company meetings—all during the period when union and management were supposed to be bargaining in good faith as to the terms of a new contract. (This was only part of their employer harassment. Space doesn't permit a lengthier write-up).

In ruling that these activities constituted a failure to bargain in good faith, the National Labor Relations Board stated: "At most, it demonstrates that the respondent was prepared to go through the motions of



engineering service

PUTS A MILL BACK IN OPERATION

PROBLEM — 1500-kw generator serving the main rod mill drive of a steel company failed. The failure caused a 40% loss of production.

SOLUTION — Westinghouse worked around the clock on an emergency basis. Windings, pole pieces and armature iron were stripped from the machine. Iron was repaired and restacked, and the series, commutating and compensating field coils were reinsulated. Commutator was repaired and generator armature rewound with new coils and cross connectors.

RESULT — An almost completely wrecked generator was put back in service in record time, thus restoring full production.

Ask about Westinghouse facilities that are available to help you with your equipment problems. Call your Westinghouse salesman or write: Westinghouse Electric Corporation, Box 868, Gateway Center, Pittsburgh 30, Pennsylvania.

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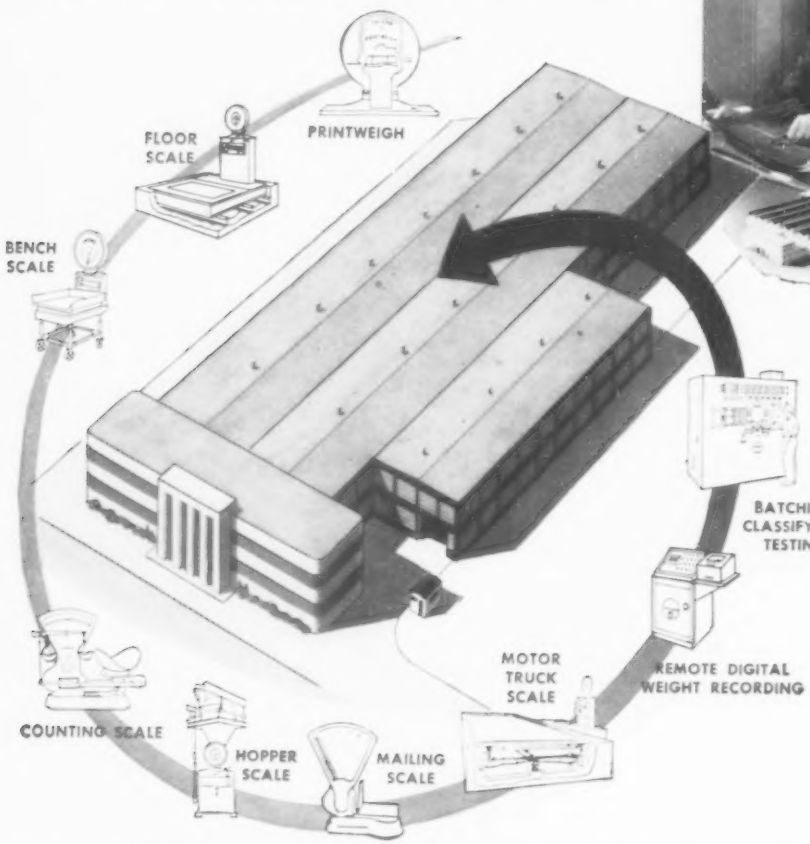
Studying Costs? It pays to start with a *Plant-Wide Look* at WEIGHING!



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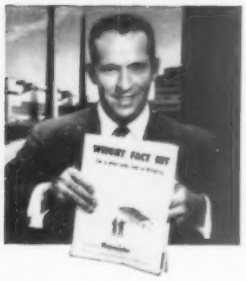

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Begins on page 208

bargaining while relying upon a campaign of harassing tactics to disrupt the company's business to achieve acceptance of its contractual demands. If an employer in the course of negotiations threatens to shut down his plant or to cut hours of work or to stop overtime in order to force a union to accede to his proposals and abandon its own demands, there can be no doubt, under established Board law as enforced by the courts, that the employer thereby is not engaging in the genuine good faith bargaining required by the Act."

The union argued in support of its conduct that if it had the right to strike, it also had the right to engage in a concerted slowdown —which its activities amounted to. The Board disagreed with this.

The Board also disagreed with the contrary views of a U. S. Circuit Court of Appeals which upset a similar NLRB ruling in the Personal Products case. The Board said its duty was to apply established Board precedent until it or the Supreme Court of the United States changes its mind.

No Docking Unless in Contract

Errant employees can be disciplined by warning slips, suspension, lockout, demotion, transfer, layoff. This is permissible under most union contracts. But if you choose to discipline employees by docking them, it's a good idea to have specific authorization in the union contract. Here's a case in point:

Some incentive employees of the Jacobs Manufacturing Company of West Hartford, Conn., slowed down. Work fell below 100% of standard. Jacobs could have laid these employees off—perhaps even fired them—and could have got away with it. But imposing either such penalty would hurt production, the company judged. So it didn't pay those who engaged in the slowdown the top rate—to which all in the group were entitled under the prevailing incentive plan. It paid these men for actual production only.

The arbitrator didn't see eye-to-eye with this procedure. Employees are supposed to get full pay, he said.

Pay cuts cannot be used as a method of discipline in the absence of specific permissive language in the contract, the arbitrator ruled.

CORRECTION

Sorry. In the February issue of FACTORY (p. 213, Racism in Union Organizing) reference was mistakenly made to the Western Electric Company. Actually, the plant involved was the Westinghouse Electric Corporation, Raleigh, N. C. Western Electric points out that it, too, is proud of its race relations and knows of no instance where racism was ever injected into its union organizational affairs.

FACTORY, also, is proud of its record of accuracy in reporting Labor Relations News. This is the first instance of incorrect identity in over 10 years of the column's existence.

renewal parts

SAVES MAINTENANCE TIME

PROBLEM — Costly maintenance time is spent because renewal parts are not kept in inventory. Yet, the cost of the part is only a fraction of the lost production time.

SOLUTION — Consult with your Westinghouse salesman. He can show you how little it will cost to keep vital renewal parts on hand.

RESULT — Hours of downtime reduced to minutes with genuine Westinghouse renewal parts in stock.

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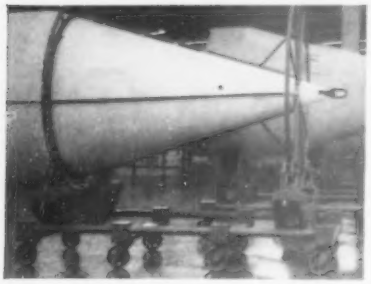

Redstone Missile rides Bassick casters on the ground. Grooved wheel caster construction permits close control of dolly. Second set of grooved wheel Bassicks permit missile to be rotated, facilitate fueling. Bassick casters are also used in handling The Nike.

Jet-age scaffold rolls to job on Bassick casters, stands steady, thanks to position locks, raises to convenient height for work. Here at Pease Air Force Base, New Hampshire, they're checking a jet engine. Could Bassick casters help speed work or save time in your plant?

Matador Dolly at The Martin Company's Baltimore plant has removable headers set up to transport Matador missile assembly. Bassick Floating Hub casters (inset) absorb shocks, snub out harmful vibration.

Bassick Casters help solve new plant problem

Decentralize for efficiency or centralize for savings . . . planned handling system lets Johnson & Johnson do both!

Johnson & Johnson's much-talked-about new plant at North Brunswick, New Jersey, is an exciting example of the savings possible with efficient materials-handling.

A 3600-ft. towline, with Bassick caster-equipped trucks, links all manufacturing operations to shipping, delivers raw materials and carries away finished products. In the shipping center, a clerk at control board (below) uses two additional 2000-ft. towlines to consign pallet loads to the 12-truck loading docks or storage. This well planned materials-handling system gives Johnson & Johnson the efficiency of decentralized management and production units plus the savings of centralized utility and services at the same time.

Trucks are equipped with 8" Bassick "S99" casters in front, and 12" Bassick "Alcore" wheels at rear. Sealed swivel and wheel bearings of casters minimize maintenance, assure long caster life, and keep floors clean of dripped lubrication grease which is both unsightly and hazardous.

Materials-handling, which represents 30% of the average manufacturer's production costs, is the one major cost area most capable of reduction. Could Bassick casters spearhead the attack on this "reducible 30%" in your plant, too?

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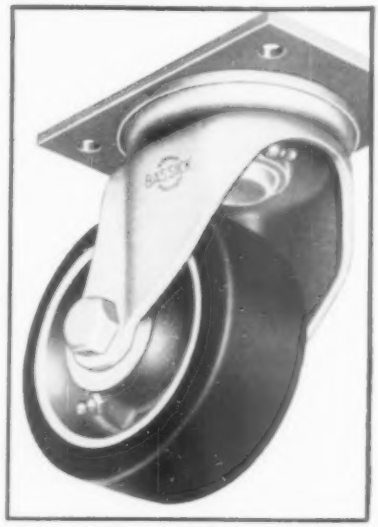

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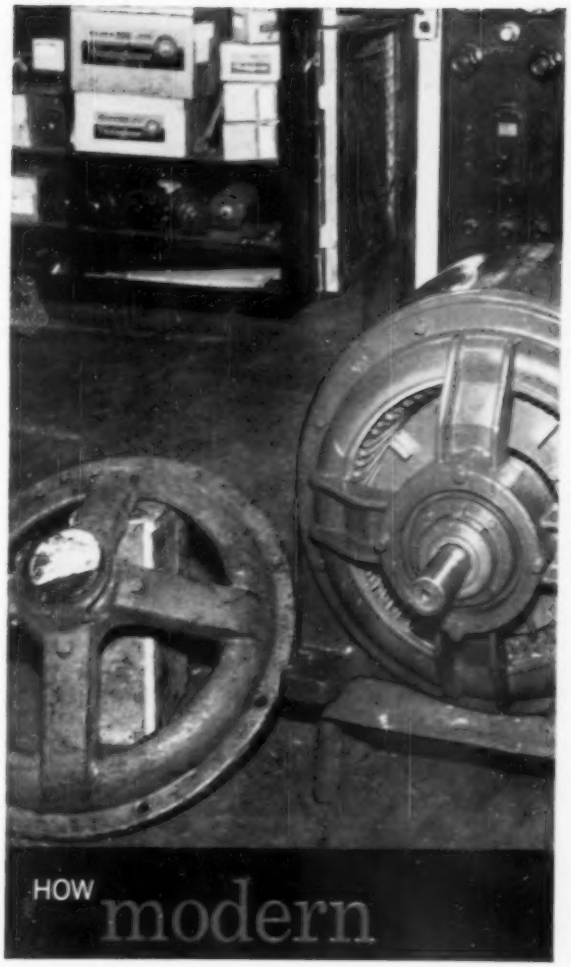

preventive maintenance
KEEPS PRODUCTION UP

PROBLEM — Dust entering the bearing oil cavities in the end brackets of this 100-hp motor eventually stopped rotation of the oil ring, causing failure. The company called in Westinghouse to help solve this problem.

SOLUTION — Westinghouse converted the motor from sleeve to ball bearing. The motor was rewound, shaft machined and new bearings and housing supplied.

RESULT — Production was increased through less downtime.

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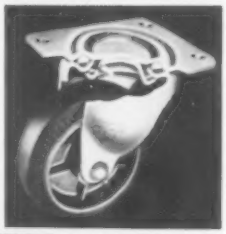
Easiest swiveling, longest lasting. Unique patented "LOCKWELD" construction eliminates king-pin, chief source of caster failure.

Illustration: Series "23" double ball race swivel casters, sizes 3"-8". Single ball race swivel casters, sizes 2"-6" and matching rigids available.



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FACTORY BOOKS

By CARROLL W. BOYCE
Manager, Features and Departments
FACTORY

Management in a Rapidly Changing Economy—You won't find this to be a book full of answers, but you will find a stimulating exposition of a lot of the problems that you will be facing over the next decade. Editor Fenn has assembled a collection of notable authors for his various sections, and they do a good-to-brilliant job of bringing together facts and opinions that will bear heavily on the problems and responsibilities of management.

Probably the most important contribution of this book is that it cannot help but get you thinking about both problems and opportunities that would not otherwise have occurred to you. If you're aware of the problems and opportunities, you'll be thinking about them. And the very fact that you think about them will prepare you to meet them in a way that will give you a competitive advantage over those who meet them unprepared.

Ed. by Dan H. Fenn, Jr. McGraw-Hill Book Co., 330 West 42 St., New York. 339 pages. $5.

Queues, Inventories, and Maintenance—Here's a contribution from the field of Operations Research that will have a major impact on the thinking and planning of plant operating management in forward-looking companies everywhere. Trouble is, it's stated in terms of high-power mathematics. Not more than a handful of companies today have O. R. groups capable of translating this queuing or "waiting line" formulation into specific "optimum" inventory policies or preventive maintenance schedules. The possible dollars-and-cents benefits are such, however, that no competitively minded company can afford to overlook the possibilities of this new approach.

For example, the author (Philip M. Morse) demonstrates the influence not merely of breakdown frequency (long recognized) on preventive maintenance, but also the influence of breakdown-time distribution. (If successive breakdowns occur after 9 hours and then after 11

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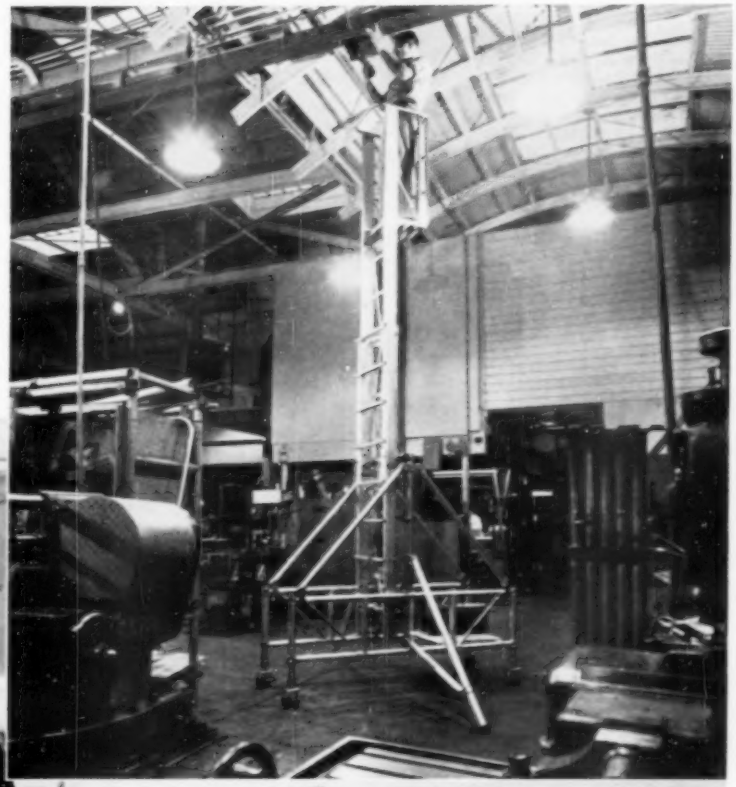

Telescopes and folds down to roll through doorways, under trusses, pipes and conveyors.

Separates easily into 3 components for convenient storage or transportation.

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Begins on page 218

more hours, you have the same mean frequency — 10 hours — as though the breakdowns occur after 1 hour and 19 hours. In the first of these extreme cases, P.M. is almost surely indicated; in the other, it is utter nonsense. This may sound simple in such an absurd example; in actual application with many machines and a large maintenance crew, however, it's far from simple.)

It's unfortunate, of course, that so few people will be able to read and understand this book. Prof. Morse hasn't tried to confuse the reader or make his book unduly complicated; this just happens to be the "state of the art" in 1958. Actually, he is to be congratulated for taking a long stride forward in relating previously abstract theory to practical problems.

Moreover, he states in his preface that he hopes to go even further: After a second book on the "methods and techniques of getting numerical answers to queuing problems . . . a possible third volume will discuss in detail solutions applicable to maintenance problems, providing tables of values corresponding to the more frequently encountered maintenance problems."

So far as we know, there have been relatively few applications of any of the O. R. techniques (linear programing, simulation, Monte Carlo, gaming, queuing) in the maintenance field. Ground has now been broken. If your company has an O.R. group, or a mathematically sophisticated industrial engineering group, be sure to bring this book to its attention—with a not-too-gentle reminder that maintenance is a fertile field for practical application.

And if you have a fair background in calculus or a lot of courage, read it yourself. The struggle may be hard, but you'll be well rewarded by an insight into one of the important techniques of the future.

By Philip M. Morse. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. 202 pages. $6.50.

Management for Engineers—Most books in this field assume that the active practice of engineering is just a passing phase for the reader; that in very few years he will have be-

"Time Study Tom"

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His real name is "SERVIS RECORDER"— an instrument that keeps track of what machines or lift trucks are doing 24 hours a day. Every stop and every start are permanently recorded. You get an exact record of total productive time and non-productive time of any machine. Now you can pin-point inefficiency quickly — and the cost is peanuts!

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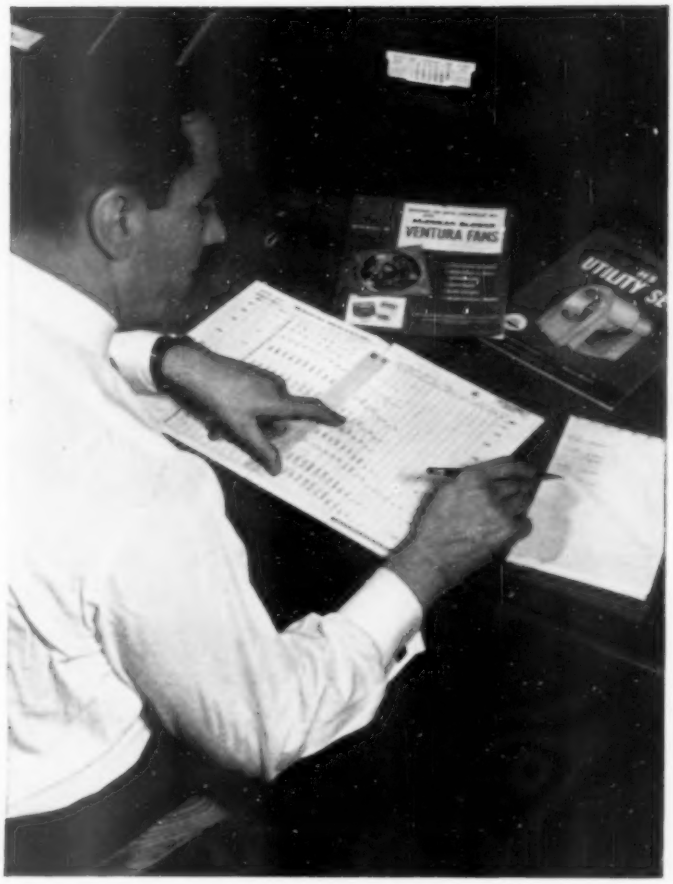

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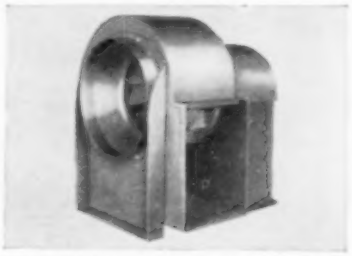
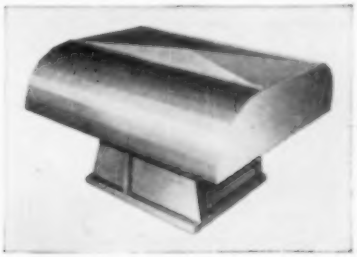


Utility Sets — Direct drive, sizes 3" to 12¼"; V-belt drive, 9" to 36".



Power Roof Ventilators — available through American Blower branches.

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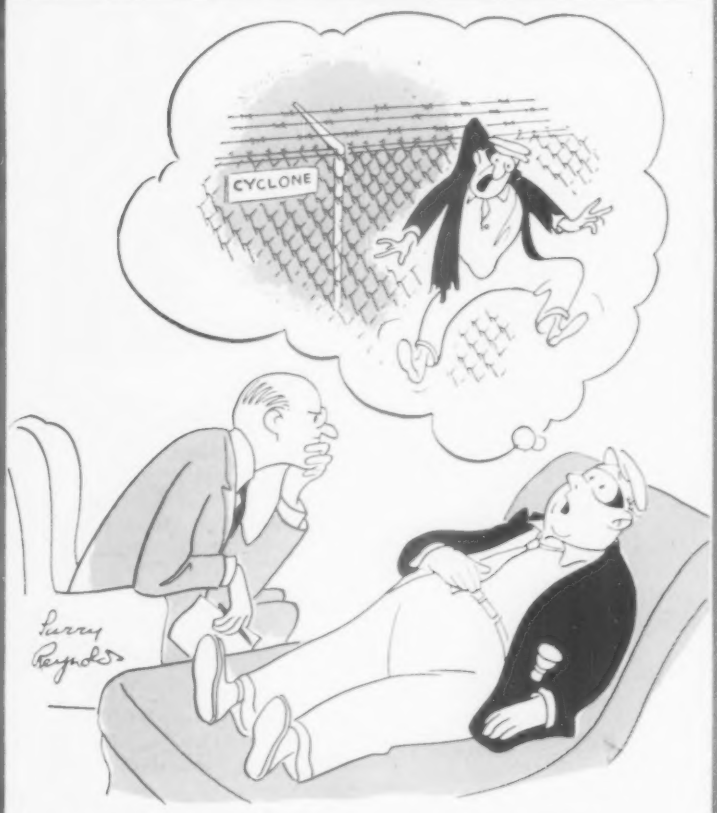

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come at least a chairman of the board. But that's not so here.

The slant here is how the engineer—as an engineer—fits into the management picture; what management expects of the engineer, and what the engineer can expect of management. It's a good, rounded picture of how management operates, but always from the point of view of the man who has not yet arrived.

If you expect to be a genuine brass hat in the next 90 days, skip this one and start boning up on Koontz & O'Donnell's "Principles of Management" (by far the best "straight management" text available). But if you figure on staying in engineering, or that you still have some time to serve before you've earned your promotion into the front office, here's a book that'll be tremendously helpful.

Incidentally, you'll probably find the lack of professor-ese language quite refreshing. The author's recent experience in teaching at Wharton Business School and Villanova hasn't softened the blunt approach he acquired as a career officer in the Coast Guard (Rear Admiral when he retired).

By Roger C. Heimer. McGraw-Hill Book Co., 330 West 42nd St., New York 36. 453 pages. $6.75.

Automation and Management—For several years now James Bright has been making distinguished contributions to the field of automation through his lectures (he's a professor at Harvard) and magazine articles (a former editor of two business publications). Much of this earlier work has been pulled together and supplemented with original material for this book. Included is Bright's near-classic study of the "levels of mechanization."

You won't find a lot of mechanical detail here. But there is a wealth of information that will help you get a better perspective on the economic and social consequences of automation—and also on its potentialities and problems for your particular type of industry.

By James R. Bright. Division of Research, Harvard Business School, Soldiers Field, Boston 63. 270 pages. $10.

A jammed switchboard is bad business.

No customer likes to wait on the phone. Furthermore, delays in completing *inside* calls hamstring your own organization. Happily, there's a practical cure for these troubles.

What you need is a P-A-X business telephone system—the privately-owned dial telephone system that is entirely independent of your present switchboard. P-A-X handles calls within your organization, frees the rented switchboard to handle outside calls swiftly and efficiently. Customers reach you quickly, the first time they call. Your own employees save precious time, because P-A-X provides immediate, private contact between persons in all departments. And, P-A-X soon pays for itself. There are no toll, mileage, or rental charges. You *own* your system.

Our booklet, "Dial Your Way," tells you more about the proven P-A-X method to improve communications, save important money. May we send you a copy? Write or call, Automatic Electric Company, Northlake, Illinois. FIllmore 5-7111.

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This on-the-job refreshment center saves coffee break time worth real money. Actual records spotlight the economy and efficiency it brings plants and offices, with savings in some instances running to thousands of dollars a year. And employees like its convenience—also like getting their refreshment at lower cost.

A model for every need—pressure type, hot and cold—standard pressure and bottle types—new economy-size Junior Cooler. All backed by General Electric's 5-year Protection Plan. Call your local General Electric Water Cooler Dealer. General Electric Co., Commercial and Industrial Air Conditioning Dept., Bloomfield, N. J.

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Perlite Institute, 45 West 45th St., New York 36.

Our Friend the Atom explains nuclear fission very simply—with 400 pingpong balls, 200 mousetraps, mirrors, and patience! Creative artists have made the story of how it all happened into an exciting film. 16mm, color, 50 min. For purchase, write:

Carl Nater, Director, Educational Film Division, Walt Disney Productions, Burbank, Calif.

The Battle For Liberty is a series of seven sound slidefilms in color that demonstrate how to explain the basic principles of life in a free society. In each section the battle of ideas starts the show dramatically. The seven slidefilms can be shown in any order preferred; each section takes 15 minutes. For purchase, write:

The Jam Handy Organization, 2821 East Grand Blvd., Detroit 11.

A Trip Through a Modern Steel and Wire Mill depicts all the steps of steel-making, from the charging of the open hearth furnaces to rolling and the finished product. 16mm, black and white, sound, 24 min. For loan, write:

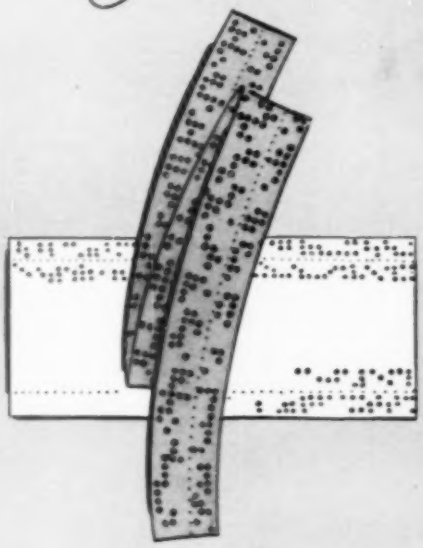
Venard Organization, 113 North East Madison Ave., Peoria, Ill.

Annotated Bibliography of Audio-Visual Aids for Management Development Programs. This third edition provides a classified, indexed, descriptive list of 321 titles of moving pictures, filmstrips, tape, disk recordings, and miscellaneous training aids. 24 pages. Available ($3.00) from:

Research Service, 353 West 57th St., New York 19.

For more facts circle 602 on Reader Service Card

Are Your Filing Methods As Fast as Your Machines?



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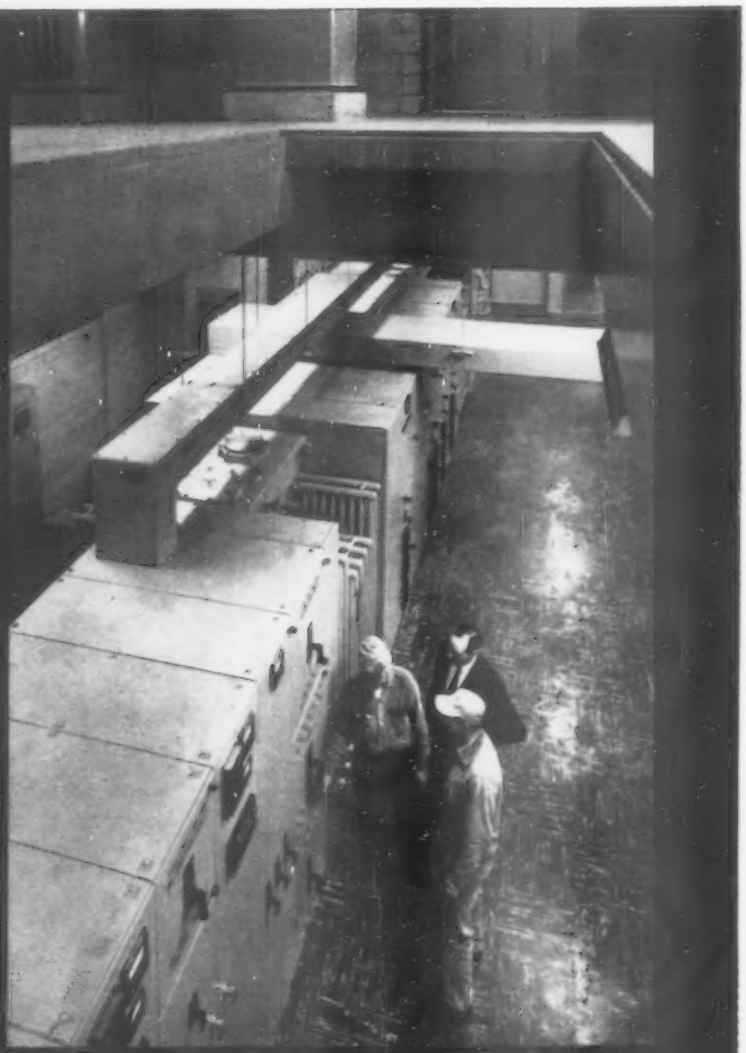


Completely coordinated by Westinghouse, this compact Power Center mounted in downstairs vault saves valuable space on main floor.

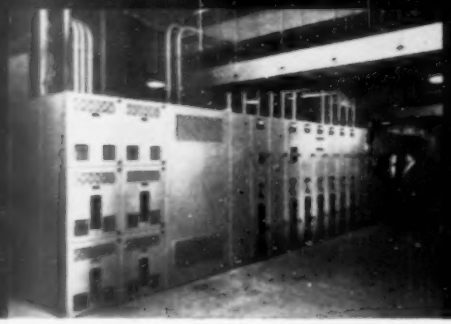
POWER-UP!

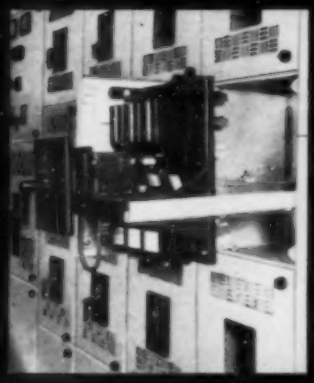
for profitability...

modernize your distribution system with compact Power Centers

Balcony-mounted Power Center solves problem of scarce floor space in crowded production areas. Light weight and greater safety of dry-type transformer make such an installation feasible.

Indoor ventilated dry-type Power Centers end the need for oil reconditioning and associated problems. Continuous, close-coupled line-up of low-voltage switchgear, transformer and primary gear results in more pleasing appearance.





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Electrical modernization calls for more efficient distribution of power in your plant. Distribution from your main sub at utilization voltages throughout a plant can be mighty expensive! Line losses mount. Voltage regulation is poor . . . motors lose torque and horsepower . . . and lighting efficiency fades.

Westinghouse Power Centers permit you to get power close to your load at high voltages . . . provide greater flexibility to your electrical system, slash line losses, give increased power continuity. They're all packaged—transformer, breakers and associated equipment—factory-assembled to specification, ready to set down and connect. These compact units can be placed close to the load with short runs at utilization voltages . . . often right in the work area . . . because of their inherent safety.

To learn how an electrical Power-Up program can make your plant more profitable, call your Westinghouse salesman or contact your electrical contractor. Ask for a copy of the Power Chek-Up kit or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania, for a copy of DB 34-150. J-60945

YOU CAN BE SURE...IF IT'S Westinghouse

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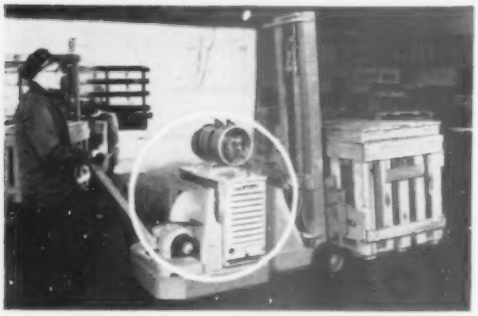

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Ready-Power's popular bantam model "W" is equipped with dependable 12-volt automotive-type starting and ignition. Variety of idling speeds and easy accessibility make it ideal for all walkie trucks as well as rider trucks up to 2,000 lbs.

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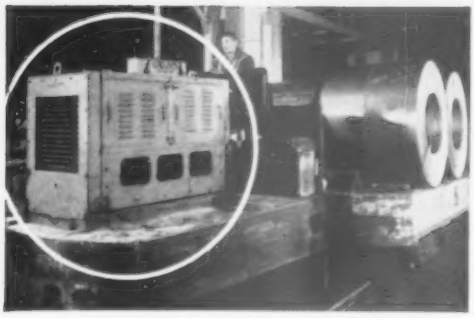
In the application shown at the left, the Ready-Power unit not only powers the truck, but also energizes the lift magnet for handling scrap metal. Ready-Power units are removable for shop adjustment while a spare keeps trucks working.



Get Diesel Electric for Lowest Ton-Mile Costs

Take a tip from the owners of industry's biggest trucks . . . power them with Ready-Power diesel-electric for maximum stamina, dependability, and lowest operating costs. Ready-Power offers power for every size and make of electric truck.

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Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

FACTORY / CATALOG NEWS
Begins on page 136

For more about these items, circle item numbers on Reader Service Card next to back cover.

30—Fans, Cyclone Separators. This 20-page booklet (Catalog Section 500-C) presents technical data on fan types, standard separators. Provides charts of dimensions, outlet velocities, capacities; specs for cyclone separators. *Fort Worth Steel & Machinery Co.*

31—Dust Control. "Industrial Dust Control" is an illustrated catalog (104) that gives detailed information about dust control systems. Explains operating principles of the "Roll Clean" Dynaclone dust filter; includes capacities, etc. *The W. W. Sly Mfg. Co.*

32—Heat, Moisture Control. Brief descriptions, with photos and diagrams, are furnished in 8-page Bulletin 135 on air engineering. Use and capacity info covers heat removal by air method in process cooling, heat treating, drying, other functions. *Niagara Blower Co.*

MECHANICAL

33—Speed Drives. This 12-page bulletin 550 presents info on high accuracy variable speed drives. Dial can be set for any speed from top to zero and reverse. Tells how to match drive to application. Photos, curves, diagrams, specs. *Graham Transmissions Inc.*

34—Reducers, Gears, Components. Catalog 100 is a color-coded 84-pager with info on stock gears, speed reducers, sprockets and chains, flexible couplings, universal joints, collars and pillow blocks. Photos, charts. *Charles Bond Co.*

35—Chain Belt Products. "Mechanical Power Transmission and Conveying Machinery" (No. 610) describes chain belt products. Lists line of chain for many power transmission, timing, tension, conveying applications. *Chain Belt Co.*

36—Cone Drive Gears. Here's an 8-page bulletin (CD-575) that shows how to adjust a set of double-

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Hudson Associates
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New York 11, New York
Gross Distributors, 216 W. 14th St.
Oklahoma City, Oklahoma
2-Way Radio, 921 NW 4th
Philadelphia 21, Pennsylvania
J. H. Sparks, Inc., 1618 N. Broad
Pittsburgh, Pennsylvania
Hahn Radio, 700 Penn Ave.
Turtle Creek, Penna.
Portland 11, Oregon
Manchester-Chandler Co.
2915 N. E. Alberta
Richmond 6, California
Watson Communication Systems
10533 San Pablo Ave.
Richmond 19, Virginia
Cottrell Electronics Corp.
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P. O. Box 1047
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Springfield 9, Massachusetts
Valley Sound Corp., 958 State Street
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Tesco Telephone Electronic Sound
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Toledo, Ohio
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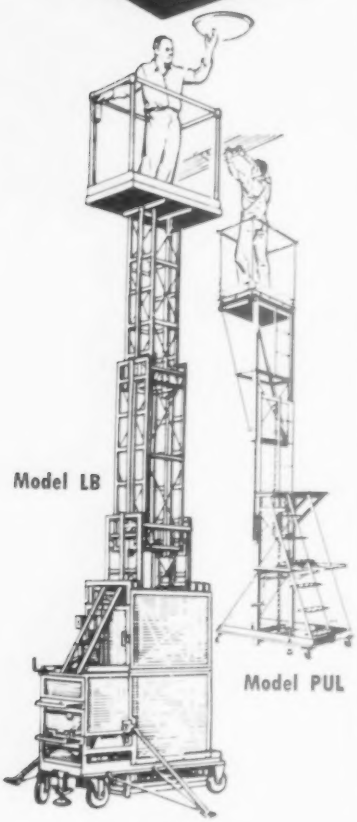

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ECONOMY ENGINEERING

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enveloping worm gears accurately with only a set of feeler gages or a dial indicator. Provides cutaway photos. *Michigan Tool Co.*

37—V-Belts. This 16-page booklet (S-51107) is called "V-Belts, the Testing, Inspection and Control of Their Quality." Describes how raw materials and finished belts are tested and inspected; explains various quality control procedures. *Goodyear Tire & Rubber Co.*

38—Couplings. Selection of new "Sure-Flex" couplings suited to more than 150 service applications is discussed in Bulletin 10100. Product is designed to withstand misalignment and end float; will absorb up to 15-deg. torsional shock. Photos. *T. B. Wood's Son's Co.*

INSTRUMENTS AND CONTROLS

39—Process Control. Illustrated 16-page catalog (510) presents line of control instruments. Describes automatic control of pressure or temperature, transmitters, receiver gages, and other systems. Control actions, other technical data. *United States Gauge.*

40—Saturable Reactors. Proportioning reactors, transductors, and switching reactors are described in Bulletin C-15 (4 pages). Gives physical and electrical properties, with dimensional outlines and complete tables. Also lists uses and applications. *Control.*

41—Flow Alarms. Fluid flow rate alarms for signalling or simple control functions are described and illustrated in 4-page Bulletin 165. Covers magnetic and electronic types for use with rotameters; each features a fail-safe circuit design. *Brooks Rotameter Co.*

42—Temperature Controls. "Got a Temperature Control Problem?" is an illustrated 4-pager (MC157) de-

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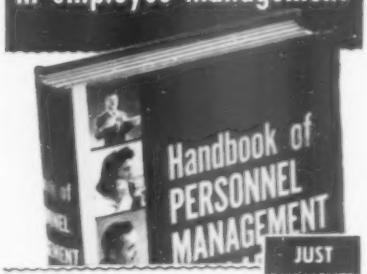

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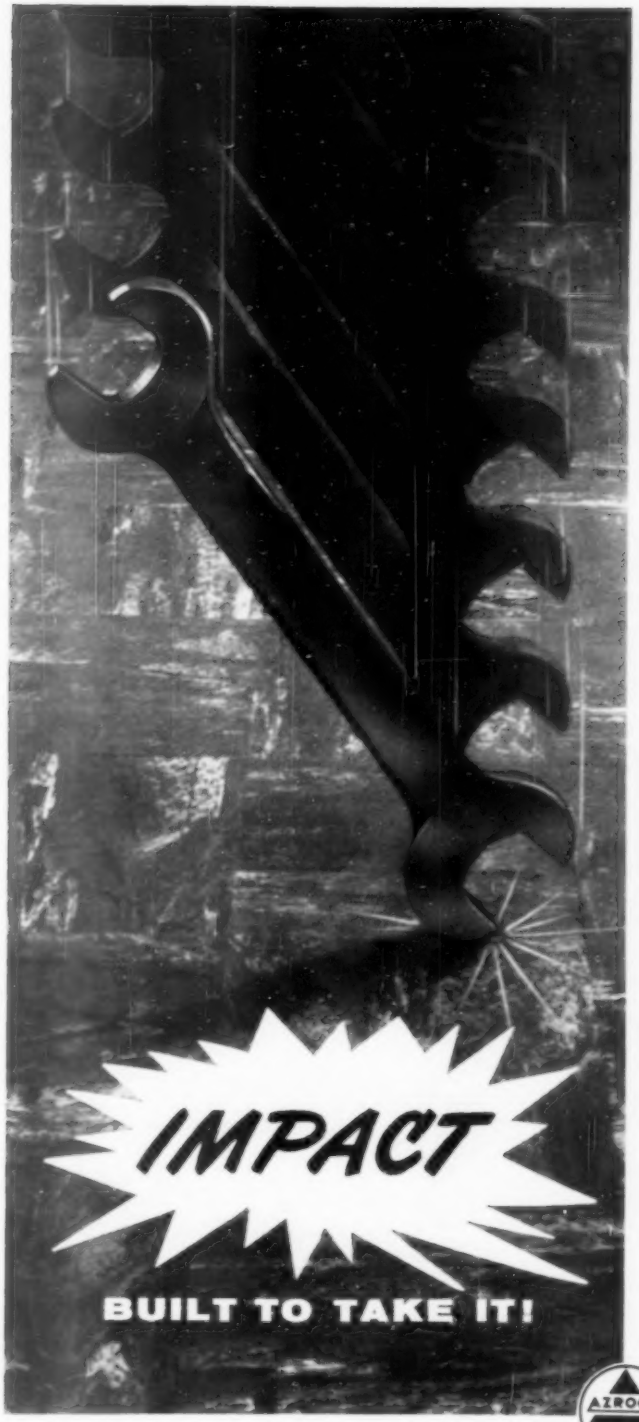

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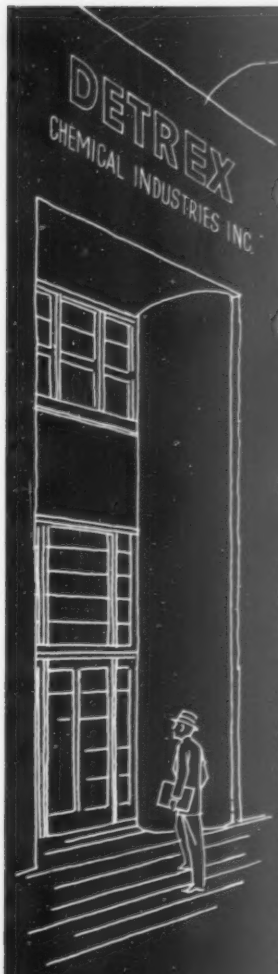

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Begins on page 136

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scribing Thermoswitch controls. Unit is said to help equipment run at faster speeds, reduce assembly costs. Includes construction details of control. *Fenwal, Inc.*

43—pH Equipment. Bulletin 5400 (8 pages) describes industrial pH instruments, electrodes, and accessories. Continuous pH measurement is used in control of chemical, metals, water, and other processes. Includes specs, photos, drawings. *Beckman Instruments, Inc.*

44—Temperature Measurement. This 4-pager (YSI-50-1257) covers thermistor based temperature measurement and control instrumentation. Gives info about interchangeable and non-interchangeable probes, tele-thermometers; photos. *Yellow Springs Instrument Co.*

ELECTRICAL

45—A-C, D-C Brakes. Bulletin GET-2770 (8-pages) provides technical data on application of a-c and d-c brakes. Discusses operation and characteristics of solenoid-, Thrustor-, and magnet-operated brakes. Includes 16 performance curves; photos. *General Electric Co.*

46—Overhead Connectors. This 100-page spiral-bound manual (Catalog OH57) furnishes information on connection techniques, connectors, and installation tooling. Gives principles of splicing, tapping, and other applications. Photos and charts. *Burndy Corp.*

47—Spin Top Enclosures. Enclosures for wide range of interchangeable magnetic starters, circuit breakers are described in Bulletin 271 (6 pages). Pictures show how to install the weather-resisting enclosure, forms and sizes; lists other features. *Square D Co.*

48—Heating Cable. Five types of cable are discussed in revised illustrated bulletin (19-457). Contains specification data for lead-jacketed

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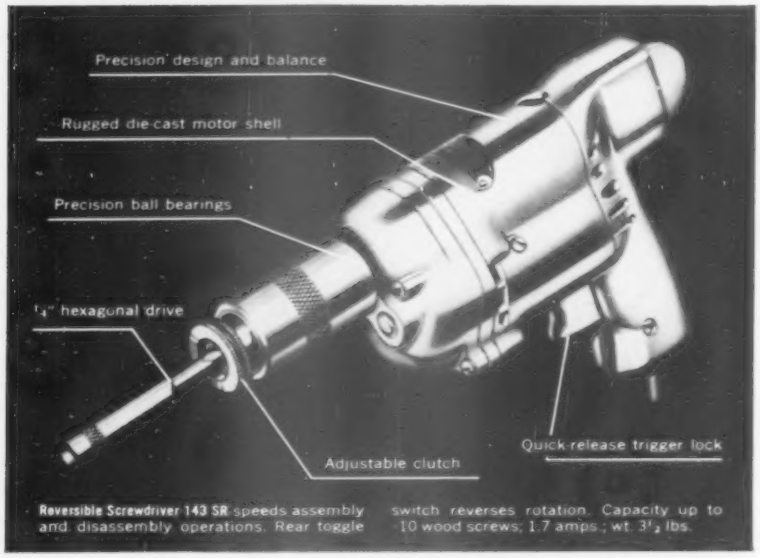
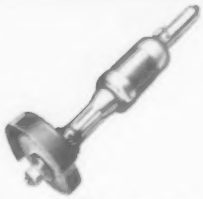


Reversible Screwdriver 143 SR speeds assembly and disassembly operations. Rear toggle switch reverses rotation. Capacity up to 10 wood screws; 1.7 amps; wt. 3½ lbs.

Flexible Shaft Machine 8 FGP for grinding or sanding has full 360° swiveling pedestal base, 6' shaft, 3-HP motor geared to operate at 4,500 rpm.



Grinder, PG 506S: air-powered; 6" wheel capacity; 6,000 rpm at 90 psi; governor holds even speed; steel motor housing takes rough handling.

Impact Wrench W-120 has reversible AC-DC, 4-amp. motor. Capacity ½", speed: 1,900 rpm free; 1,400-rpm load. Cuts job time in maintenance.

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asbestos, thermoplastic-jacketed, silicone rubber, asbestos-braided wire. Includes curves. 8 pages. *General Electric Co.*

49—Fuses. In addition to showing various types of fuses this 16-page illustrated catalog (Form 48) presents recently patented "cooling fin" knife-blade type fuse. Gives technical data for other products, including blowing time limits. *Monarch Electric Corp.*

50—Motor Controls. An illustrated 56-page catalog (5800) makes motor control selection easy. Quick selector tables give horsepower, speed, heater size, ampere ratings, enclosure choices. Covers pressure switches, pushbuttons, pilot devices. *Furnas Electric Co.*

51—Induction Motors. Here are 16 pages of info on large induction motors. Bulletin 1950 describes motors of 150 to 1250 hp. and their application for compressors, cooling-tower pumps, mixers, etc. *The Louis Allis Co.*

52—Interlocked Cables. Four types of cables—600-, 5000- and 15,000-volt grounded neutral, and 15,000-volt ungrounded neutral—are described in Bulletin RCP730. Gives general info on these interlocked armored cables. Photos, sketches. 12 pages. *Rome Cable Corp.*

53—Individual Motor Controls. Bulletin GEA-6584 (8 pages) discusses coordinated starters for low-voltage motors up to 600 volts, 1500 hp., and three-phase. Cites features and applications of various types of starters; other data. Photos. *General Electric Co.*

54—Unit Substations. Secondary unit substations and wide selection of components are described in 20-page bulletin (9004-A). Lists components for incoming line, transforming, outgoing sections. Has specs, application info, photos. *I-T-E Circuit Breaker Co.*

Turn the page

flowing air moves bulk materials better

AUTOMATIC PRODUCTION STARTS HERE: This compact Airstream Conveyor installation is at Easton (Md.) feed mill of J. McKenny Willis & Son, Inc. Self-cleaning system unloads 25 tons per hour of soft meals for animal feed without dust, waste or mixing of meals. Vertical movement requires no more power than horizontal flow.

Efficient bulk materials handling is a major factor in any modern plant. Outmoded handling methods put a costly kink in production processes which are otherwise smooth and automatic.

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Airstream Conveyors are enclosed and self-cleaning, permitting movement of different materials in quick succession without dust, waste or intermixing. Conveying lines require little space, conform easily to existing plant layouts, can be installed out-of-the-way without expensive structural supports.

For more information on how flowing air can move your bulk materials better and cut handling costs, call or write:

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New 32-page brochure presents detailed information on how Dracco Airstream Conveyors have solved bulk materials handling problems. Write for Bulletin 530.

DRACCO *airstream* conveyors
dust control equipment

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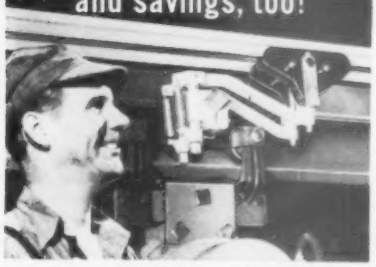

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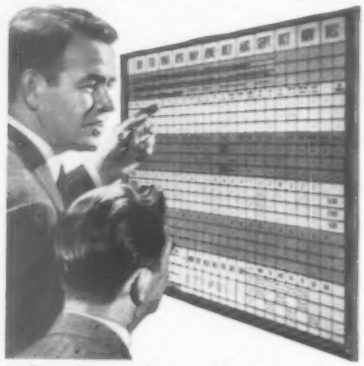

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FACTORY / CATALOG NEWS
Begins on page 136

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55—Cable Terminators. This 12-page catalog (5703) illustrates and describes single and multiple terminators for indoor and outdoor service. Covers gaskets, cable entrances, internal and aerial connectors; gives dimensions, ratings. *H. K. Porter Co., Inc.*

56—Wrought-Iron Conduit. Advantages of wrought-iron electrical conduit are set forth in this booklet (Form 680). These 8 pages include composition, dimension, weight data of corrosion-resistant wrought-iron conduit. Photos. *National Electric Products Co.*

BUILDING AND MATERIALS

57—Roof Ventilators. Bulletin 2301 is an 8-page illustrated guide to power roof ventilators that feature the low modern appearance. Describes both exhaust and supply series of ventilators. Has dimension, capacity tables, and accessories. *Ilg Electric Ventilating Co.*

58—Color Conditioning. Scientific painting plan for industrial plants and offices is presented in 4-color, 32-page booklet (A-9624 Rev.). Discusses "brightness engineering," lists safety color code approved by National Safety Council. *E. I. du-Pont de Nemours & Co., Inc.*

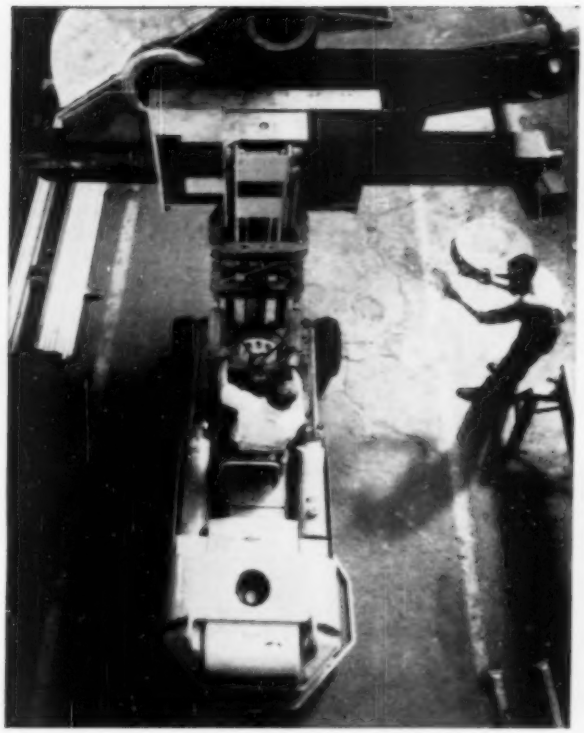
59—Steel Doors, Frames. Catalog (AIA File No. 16-A) features new door designs including transom and sidelite frame combinations, industrial doors, frames, hardware. Charts, photos, drawings. 8 pages. *The Steelcraft Mfg. Co.*

60—Flooring Products. Rubber, Koroseal vinyl, and asphalt floor tile, stair treads and accessories are described in this 16-page 4-color catalog (Form SC-58). Gives specs and photos; lists colors and flooring product definitions. *B. F. Goodrich Flooring Co.*

Turn the page

B.F.Goodrich

Pneumatic? B.F.Goodrich makes a complete range of sizes and variety of tread designs, including the new All-Purpose.



or Solid? Which is right for you? Pressed-On Solid in regular or Deluxe Cushion, or Vulcanized-On Solid? What tread design? What compound?

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BARRETT MODEL HX

Pallet Truck with proved differences

exclusive features make operation easier, increase maneuverability, add strength, cut in-use costs

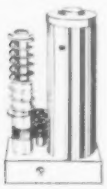
Look at the time-saving hydraulic pump and ram on this Barrett Model HX pallet truck. See and test the annoyance-ending "flying saucer" entry wheels that guide forks quickly into pallets. Check the extra strong, all-welded ribbed frame construction that means money-saving durability.

Add its other features and be convinced of its extra value:

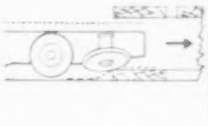
- *Full 4½-in. lift*—multiple stroke—5⅝ in. underclearance, raised.
- *Overload by-pass valve*—factory-sealed, operates automatically to protect truck from damage.
- *Spring-controlled foot treadle*—out of the way, turns with 190° handle.
- *Needle-type lowering valve*—adjustable for perfect control.
- *Length only 13¾ in.*—fork stop to extreme front end for easy maneuverability in narrow aisles.
- *Lightweight but strong*—weighs under 200 lb. (with 48-in. forks).
- *Capacity*—loads 2000 and 2500 lb. Other models available in 4000- and 6000-lb. capacities.

WRITE FOR BULLETIN 5511

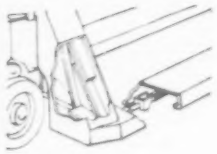
Ever see a time-saving feature like this hydraulic pump and ram package unit? Simply remove one bolt to change entire unit.



Exclusive feature with Barrett: "flying saucer" entry wheels skim into double-faced pallet—no pushing empty pallet ahead of truck.



Another Barrett exclusive: rugged, all-welded ribbed frame to withstand forces and stresses of hard, continuous use.



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Materials handling equipment *engineered* to your job

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For more about these items, circle item numbers on Reader Service Card next to back cover.

61—Building Panels and Panes. Catalog AIA File No. 26-A-9 (8 pages) discusses Structoglas "A" reinforced plastic corrugated building panels and flat panes. Gives information on mechanical and physical properties, weather exposure test. Diagrams, too. *International Molded Plastics, Inc.*

62—Floor Plates. Here's a 4-pager (AMC-1) that describes the physical properties of rolled steel floor plates. Easily installed, these 11- and 16-gage, 12-in. square plates are said to end floor replacements, provide safe, quiet, durable flooring. *Ackermann Mfg. Co.*

63—Brick and Tile. This 8-page catalog describes "Impervo" brick, floor brick, and quarry tile. Is said to meet the most severe industrial requirements and offer the highest resistance to chemicals, wear, and impact. Has specifications, drawings. *Hanley Co.*

64—Rolled and Wired Glass. Two catalogs discuss rolled, figured, and wired glass. No. 58-G (20 pages) gives maker's complete line of glass for industrial plants. No. 58-I explains applications of diffusing and heat absorbing, and wired glass. *Mississippi Glass Co.*

65—Power Raceway. Catalog No. 857 (16 pages) describes and illustrates an underfloor electrical distribution system. There are 8 pages of dimensional drawings, specifications for power raceway systems, and data on supports and other fittings. *Walker Brothers.*

PRODUCTION

66—Induction Heaters. Bulletin 12B6430B (12 pages) illustrates and describes construction, design features of high-frequency induction heaters and melting furnaces. Heater is self-contained unit; comes in output ratings from 10 to 100 kw. *Allis-Chalmers Mfg. Co.*

Turn the page

For more facts circle 618 on Reader Service Card ▶

You're looking at the exclusive key to continuous dust collecting!

You are inside a Pangborn Dust Collector. And this is Pangborn's traveling manifold . . . the exclusive self-cleaning development that permits continuous suction at highest efficiency. The result is the incomparable performance of cloth type collectors with minimum resistance to air flow and with no shutdown required.

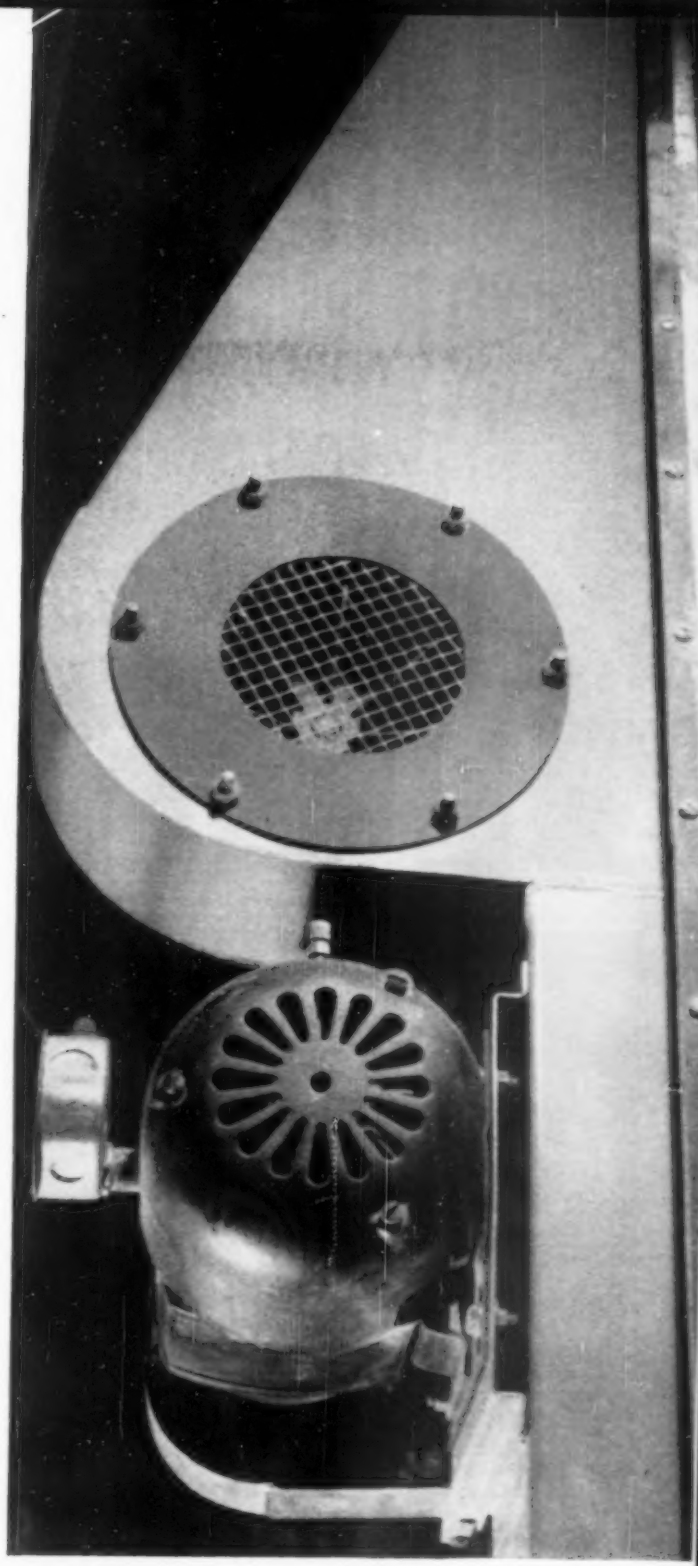
Typical Pangborn engineering . . .

This advance is particularly important in collecting finely-divided dry dusts. But the Pangborn engineering it typifies is important to *any* dust-producing plant. It is not enough to place a dust collector within a plant. An efficient dust collecting system must be *scientifically* planned, designed and constructed to handle effectively a specific dust problem. This *thinking* is incorporated into every Pangborn proposal.

. . . that can help you

One of Pangborn's comprehensive line of dry and wet dust collectors can be utilized in a Pangborn-engineered dust system to solve *your* dust problem . . . whether it involves any kind of fine, coarse, dry, moist, corrosive, hot or obnoxious dusts.

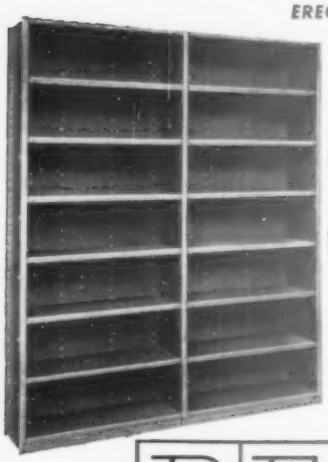
The Pangborn engineer in your area will be glad to take off his jacket and go to work for you. He is a dust *expert* and will discuss your individual problem at no obligation. And, for more information, write for "Out of the Realm of Dust" to: PANGBORN CORP., 2100 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*



Pangborn CONTROLS DUST

DELUXE BOLTLESS STEEL SHELVING IS THE STRONGEST, SAFEST SHELVING YET IT COSTS NO MORE

ERECTED FASTER—INSTALLED COST IS LOWER



BOLTLESS SHELF BRACKET
Merely insert four to a shelf—no tools or special equipment needed.

ONE-PIECE BIN-TYPE UPRIGHT
Single upright member between sections provides faster erection, more rigid assembly.

BUILT-IN SHELF REINFORCING
Reinforcing bars imbedded in the shelves, eliminating many erection crew man hours.

For assistance in planning your stockroom and other storage problems and for fast friendly shelving service, call your local Deluxe dealer. Write for new Catalog No. 30.

DELUXE METAL FURNITURE CO., Warren 8, Pa.
A Division of Royal Metal Manufacturing Co.

DELUXE
STEEL SHELVING

For more facts circle 619 on Reader Service Card

Safety condition your plant with "SAFETY-WALK"

Here's the new mineral-coated fabric that provides perfect traction—*sure footing*—even under water or grease! And it's easy to apply, easy to keep clean. Use "SAFETY-WALK" Non-slip Surfacing also on stairways, ramps, walkways—wherever the danger of a fall is present. It pays off in accident prevention, better employee relations . . . stops costly production delay.

FREE SAMPLE! Please send me "SAFETY-WALK" sample and complete information
Minnesota Mining & Mfg. Co.
Dept. OQ-48, St. Paul 6, Minn.
Name .....
Company .....
Address .....
City ..... Zone ..... State .....

REG. U.S. PAT. OFF.
SAFETY-WALK
BRAND
NON-SLIP SURFACING

Made in U.S.A. by
Minnesota Mining & Mfg. Co.
St. Paul 6, Minn.

Made in U.S.A. by Minnesota Mining and Mfg. Co., St. Paul 6, Minn. Export Sales Office: 99 Park Avenue, New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

3M

FACTORY / CATALOG NEWS
Begins on page 136

For more about these items, circle item numbers on Reader Service Card next to back cover.

67—Metal Finishing. Here are 24 pages that explain mechanical finishing process. Tells how Roto-Finishing is applied to grinding, deburring, descaling, polishing, and coloring of metal parts. Catalog ROT258 has flow diagram, photos, accessories. *Roto-Finish Co.*

68—Welding Torches. Catalog F8982-C contains information about full gas shielding, minimum electrode stub loss, simple design and ease in handling these torches. Has pictures, specifications, selector tables, and drawings of installations. *Linde Air Products Co.*

69—Grinding Machines. Four models of rotary surface grinders, a cylindrical-internal grinder, and Jigmatic tape-controlled positioning table are described in 8-page brochure (C-8). Each machine is pictured and has specs covering it. *Arter Grinding Machine Co.*

70—Chucks, Accessories. Chucks, arbors, speed reducer, and push-pull tapper are shown in Catalog 274R5 (8 pages). Cutaway drawing of chuck reveals construction features. Capacity and dimension tables, photos, drawings give technical data. *Supreme Products Corp.*

71—Cleaning Machines. Catalog 951-D presents maker's entire line of airless blast cleaning machines. These 32 pages describe wet and air blast, dust control equipment, cast steel shot and grit abrasives, sand-cutters, core rod straighteners. *Wheelabrator Corp.*

72—Vacuum Plating. Sometimes called vacuum metalizing, this metal-finishing process is described in 24-page catalog (780). Without buffing or polishing, it gives a bright lustrous finish on metal, glass, paper or textiles. Gives specs. *F. J. Stokes Corp.*

73—Die Sets. Catalog No. 570 has 64 illustrated pages of info on die sets, many components and accessories. There are 34 pages thumb-

Centralized Control of Air Conditioning Saves Manpower, Assures Ideal Working Environment

North American Aviation, Inc., Los Angeles, California. Austin, Field & Fry, AIA, architects and engineers; Wm. Simpson Construction Co., general contractor; Western Air & Refrigeration Co., air conditioning contractor; all of Los Angeles.

Manpower savings of at least three men per day, reduced fuel and power consumption, longer equipment life and 24-hour-a-day comfort are made possible by this Johnson Control Center at North American Aviation's busy new headquarters!

From the Center, *one man* operates all the basic heating, cooling and air handling components of a modern high pressure, double duct air conditioning system.

To aid him, all vital operating data needed to keep the system functioning at peak efficiency are transmitted to the panel from remote locations throughout the windowless, three-story building. Simply by scanning the panel or pushing a button, the engineer can check fan operations, temperatures, pressures and related data from well over 100 key control points!

Johnson Control Centers are applied to buildings of all types and sizes. They assure the very best, most productive working environment your air conditioning can produce. And you'll quickly recover your investment through major savings in operating costs and manpower. For the facts, see your engineer, architect or local Johnson branch. Johnson Service Company, Milwaukee 1, Wisconsin. 105 Direct Branch Offices.

JOHNSON CONTROL

PNEUMATIC SYSTEMS

DESIGN • MANUFACTURE • INSTALLATION • SINCE 1885

TEMPERATURE CONTROL SYSTEMS FOR SCHOOLS, OFFICES, FACTORIES, STORES, HOSPITALS, HOTELS, PUBLIC BUILDINGS

For more facts circle 621 on Reader Service Card

THE EXPERIENCE OF OTHERS IS FREE

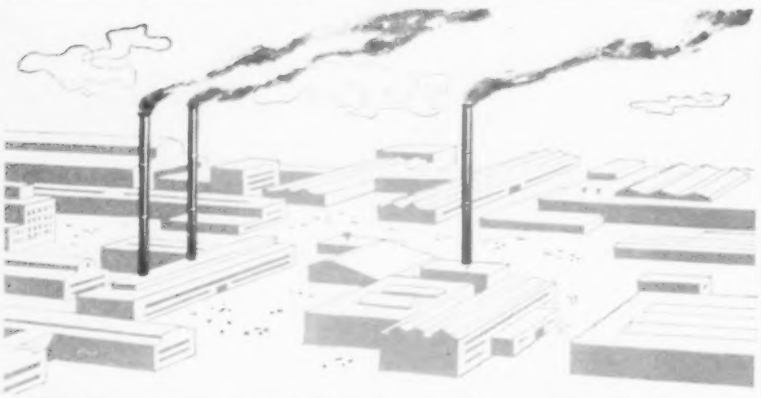
Check the bulletins you'd like to have.
Clip this ad and mail it today.

- ☐ 157 DC Milliammeter Applications
- ☐ 753 Improve Foundry Operation
- ☐ 856 How to Make Plant Surveys
- ☐ 934 Power, Power Factor and Profits
- ☐ 939-A What You Can Do with a Wattmeter
- ☐ 1036 Engineering a Steel and Wire Plant
- ☐ 1041 Electric Furnace Costs Reduced
- ☐ 1156 Operation Recorder Applications

Product Representatives in Most Principal Cities

The ESTERLINE-ANGUS Company, Inc.
Pioneers in the Manufacture of Graphic Instruments
DEPT. J 6, P. O. BOX 596, INDIANAPOLIS 6, INDIANA

For more facts circle 622 on Reader Service Card



Glass-protected stacks...

Permaglas® smokestacks are glass-protected (inside and out)... are virtually impervious to condensate corrosion

✱ Accelerated life tests prove that *Permaglas* stacks last 3 to 5 times longer than plain steel stacks

✱ *Permaglas* stacks are easy to install—no special equipment needed

Write for the money-saving facts . . . get Bulletin SS-202

Through research ... a better way

A.O.Smith
CORPORATION

PERMAGLAS SMOKESTACK SALES
PROCESS EQUIPMENT DIVISION
● MILWAUKEE 1, WISCONSIN

A. O. Smith Corporation, Dept. F-4, Milwaukee 1, Wisconsin
Gentlemen: Please send me a copy of the Permaglas Smokestack Bulletin No. SS-202.

Name_____ Title_____
Firm_____
Address_____
City_____ Zone____ State____

Begins on page 136

For more about these items, circle item numbers on Reader Service Card next to back cover.

indexed for easy reference to specific units. Tables show how to select correct sizes. Other technical data. *Standard Die Set Co.*

74—Lathes. Bulletin No. 1506 (32 pages) features Preselector Dyna-Shift lathes in 12 models. For manufacturing and toolroom use. Unit allows operating speeds to be pre-set, provides automatic spindle speed calculation, has wide speed range. *Monarch Machine Tool Co.*

MISCELLANEOUS

75—Vibrator Control. This 4-pager (K3B) presents data on stopping vibration, shock, and noise transmission by using steel spring machinery mountings. Eight typical case histories, installation photos, tables. *The Korfund Co., Inc.*

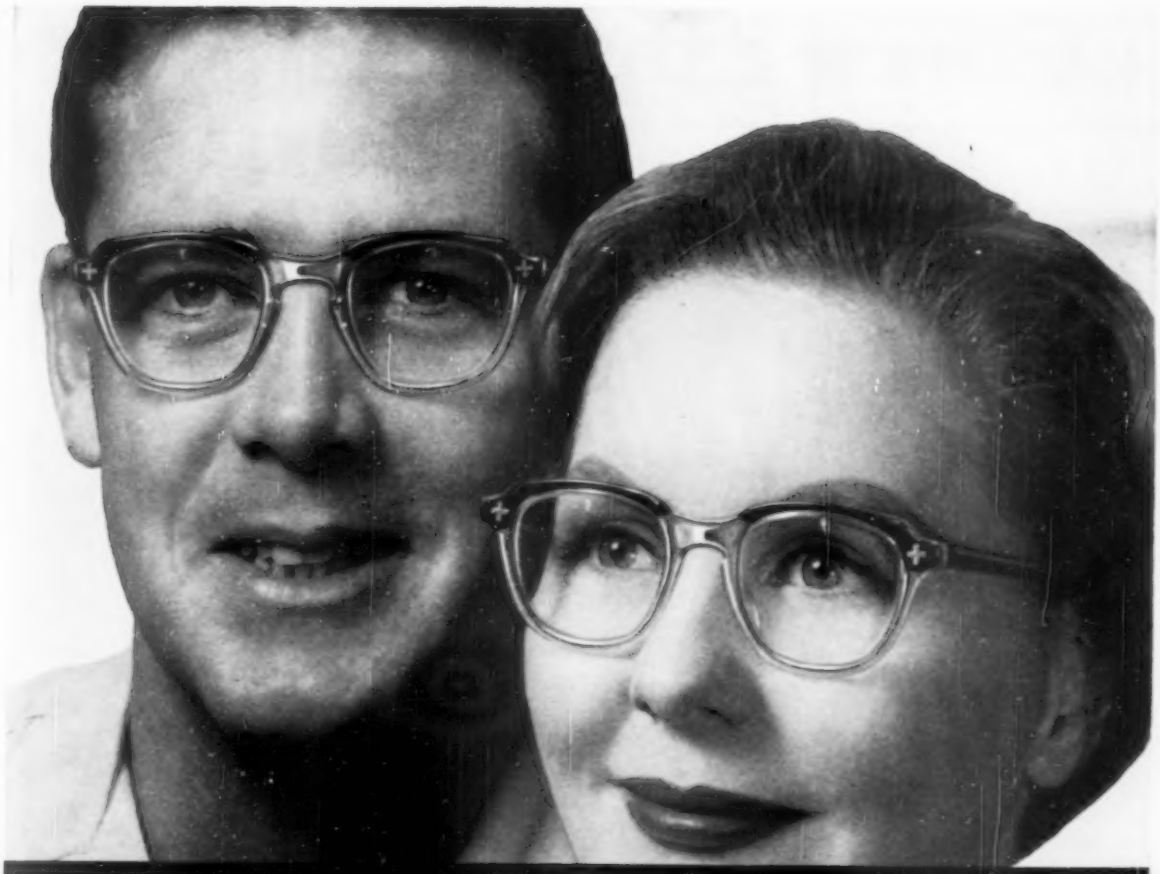
76—Fire Extinguishers. Catalog P40 describes extinguishers and fire safety systems. Includes portable and built-in carbon dioxide fire extinguishers, smoke detectors and rate-of-rise fire detectors. *Walter Kidde & Co., Inc.*

77—Packaging. This 13th edition (No. 5) of the Little Packaging Library has 24 pages on designing, testing, storing of product packages. Info on packing, sealing, warehousing, shipment of corrugated boxes. *Hinde & Dauch.*

78—Closed Circuit TV. Industrial applications of closed circuit TV are described in 3½x10-in. illustrated 16-page booklet. Gives typical closed circuit TV camera systems, applications, equipment; also miniature camera applications. *Blonder-Tongue Laboratories, Inc.*

79—Pattern Making. The development of wood, metal and plastic pattern production is described and illustrated in a 12-page booklet. Discusses also molds for short-run use, core box and drier developments, pick-up, setting, other fixtures. *The Motor Patterns Co.*

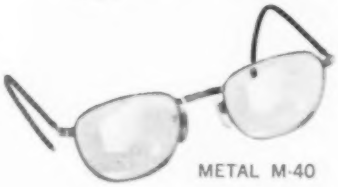
For more facts circle 623 on Reader Service Card



You get so much **MORE** out of B&L **PROTECTION-PLUS** Safety Glasses!

ACETATE Y-60

COMBINATION Y-90



METAL M-40

+ **PROTECTION** • Frames unsurpassed in strength and durability. Bal-SAFE lenses . . . plano or prescription . . . give *maximum impact resistance.*

+ **ECONOMY** • Exclusive "integrated" design of line (interchangeable parts and accessories) means smaller inventory. Frame life expectancy is demonstrably greater.

+ **WORKER ACCEPTANCE** • Products of nation's top ophthalmic specialists . . . expert in modern eyewear development . . . styling and comfort.

When you standardize throughout your plants on Bausch & Lomb Safety Eyewear, you're in the best possible position to demonstrate . . . to workers AND management . . . the wisdom of your choice.

You get maximum protection *plus* economy *plus* your workers' hearty OK. Want to be "filled in" on the latest in this line? Call the Bausch & Lomb supplier in your area, or write: Bausch & Lomb Optical Co., 90128 Smith Street, Rochester 2, New York.

BAUSCH & LOMB

SINCE B&L 1853

On man and woman at top, T-60 Two-Tone Frames.

For more facts circle 624 on Reader Service Card

For more about these items, circle numbers on Reader Service Card next to back cover.

THIS DIE PRODUCED OVER 65,000 PARTS . . .

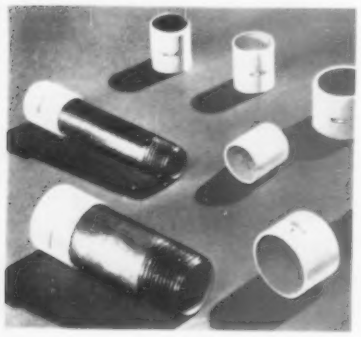
. . . ANOTHER MADE 130,000 OF THESE PARTS

"Plastic Tooling" Dies Reduce Time, Costs

Here's a tooling method that sometimes permits runs of 150,000 stampings of low-gage softer metals. It is based on an epoxy-resin system reinforced with metal or glass fibers and metal fiber flocking.

This technique, known as Epoxy-Alloy, is applicable to prototype and development-type metal-forming dies, secondary operation dies, hydroform and rubber pad forming dies, stretch dies, and fixtures. Material and process will permit mass casting, reduce tooling time and costs, substantially increase thermal conductivity, give greater modulus and impact strength. An entire tool can be pressure-cast and cured simultaneously. Research and development work on the process was carried out in cooperation with tool and die fabricators. To date, about 70 Epoxy-Alloy dies have been put into operation. Thus, medium production-run metal forming has been attained.

Bakelite Co. (Circle 251, Reader Service Card.)



Now It's Snap-On Thread Protectors

The thread protectors (shown at left) are called Tecto-Caps. They snap on instantly and will not come off unless unscrewed. Trick is an ingenious metal staple that snaps into and conforms to thread pattern, yet does not damage threads. And holds cap firmly.

These protectors are made from plastic-coated kraft paper that gives them ample structural strength for most applications; snug fit close to the surface keeps out dust, dirt, etc. The plastic coating protects against moisture, grease, chemicals, or other conditions that cause corrosion. Caps are available in diameters to fit pipe and rod sizes up to one inch, in either closed or open-end types.

Precision Paper Tube Co. (Circle 252, Reader Service Card.)

Turn the page

NEW DEVELOPMENTS IN MODERN MATERIALS HANDLING EQUIPMENT

RAPISTAN Ideas HANDLING

New Storage Principle Cuts Warehousing Space and Cost

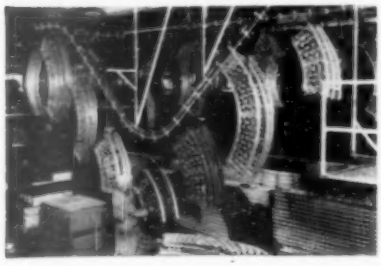
Savings up to one-third in both warehouse space and inventory investment are possible through use of the new principle of "positioned inventory at the point of use". Storing raw materials, components, or sub-assemblies as close and convenient as possible to the place they will be next used, saves central stores warehouse space, saves at least one movement of materials, and reduces paper work.

Rapistan Flow Rack storage conveyor has given these practical benefits to a wide range of industrial plants and warehouses. For ideas on how Flow Rack can cut costs in your business, **circle No. 1** on the coupon.

HOW USE OF "AIR RIGHTS" RELEASES FLOOR SPACE

Rapistan overhead conveyor serves an unusual purpose in warehousing bulky products in this manufacturing plant.

Using free air space to warehouse hard-to-store objects, Rapistan overhead conveyor releases 6,000 sq. ft. of floor space formerly required for finished goods inventory, while accommodating 50% more stock. This has also resulted in considerable improvement in rate of order selection. For complete details, **circle No. 2** on the coupon.

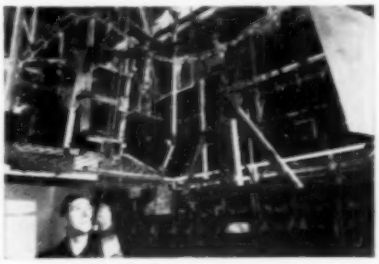


NOVEL USE DISCOVERED FOR OVERHEAD TROLLEY CONVEYOR

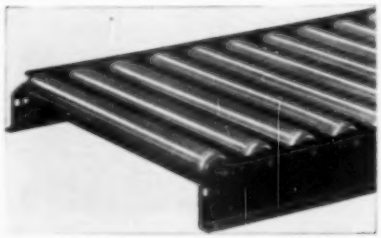
Overhead conveyor serves a new and unusual purpose at The Rapids-Standard Co., Inc., improving efficiency and saving 50% of the space in this firm's small parts welding department.

Welding jigs and fixtures are stored on a Rapistan overhead conveyor, releasing all the floor and shelf space formerly required to store these tools. On the overhead line, the tools are safe from damage, easy to find in a fraction of the time formerly needed.

For complete information on how Rapistan overhead conveyor can cut costs and save space in your business, **circle No. 4** on the coupon.



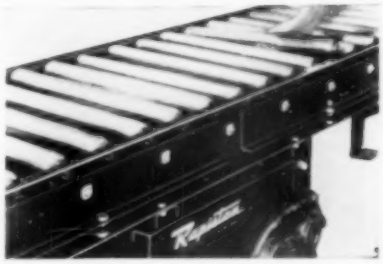
Rapistan Roller Conveyor Now Features Snap-In Interchangeable Rollers



Spring-loaded snap-in rollers make new Rapistan gravity roller conveyor exceptionally versatile. Rollers are easy to re-space in the frame while the conveyor is installed – can be removed or inserted without bolts or wrenches.

Rapistan now offers this exclusive interchangeable-roller conveyor in many types and sizes of 1.9" roller: aluminum, galvanized or steel, for medium and heavy duty use. New reduced prices make it your best gravity roller conveyor value. For full information, **circle No. 3** on the coupon.

RAPISTAN LIVE ROLLER CONVEYOR FEATURES SAFETY



A high degree of personnel safety is attained by the new "pop-out" roller construction of Rapistan live roller conveyor. Carrier rollers pop out from the frame if hands, clothing, or other material becomes wedged between a roller and the drive belt – thus eliminating the most common cause of personal injury accidents to people working with old style live roller conveyors.

This is an exclusive Rapistan feature. Similar safety-conscious engineering goes into all Rapistan materials handling devices. For complete information on Live Roller, **circle No. 5** on the coupon.

Newspaper of Materials Handling Ideas Every Month

Since materials handling plays an important part in all businesses, you'll be interested in the dozens of valuable, cost-cutting ideas pictured regularly in The Rapid Handler, our free picture newspaper of materials handling ideas, sent every month to all who request it.

Over 70,000 cost-conscious executives now receive it, read it, profit from it. To start your copy coming regularly, just **circle No. 6** on the coupon.

Rapistan®
new ideas in materials handling

The RAPIDS-STANDARD CO., Inc.
371 Rapistan Bldg., Grand Rapids 2, Mich.

circle the items of particular interest to you, clip this coupon, and mail it attached to your letterhead

1 2 3 4 5 6

For more facts circle 625 on Reader Service Card

NO RUST PROBLEMS AND NO FIRE HAZARDS

WITH

ANDEROL L-536

NON-FLAMMABLE RUST PREVENTIVE

Wherever your metal equipment is subject to rust . . . you need the positive protection of Anderol L-536 Rust Preventive which is non-flammable and non-toxic. Just spray it on and forget it.

Anderol L-536 gives metal equipment or products positive protection against moisture or salt spray . . . in storage, in transit, over the weekend, or during downtime. From huge presses to tiny bearings, every shop has a need for this simple, on-the-job method of preventing rust and corrosion.

SEND TODAY for one 16 oz. container at $2.00 . . . or order a case of 12 spray cans for $21.00, F.O.B. Chestertown, Maryland. Satisfaction guaranteed.

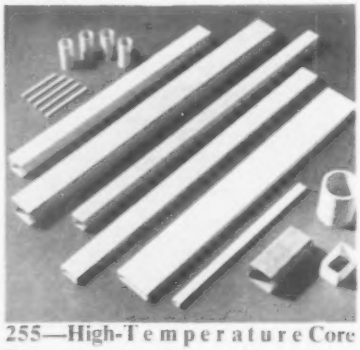
ANDEROL
The World's Finest Lubricants

LEHIGH CHEMICAL CO.
FM-4, Chestertown, Md.

For more about these items, circle numbers on Reader Service Card next to back cover.

253—Compound for permanent bonding of rigid polyvinyl chloride pipe sections and fittings is called PVC. It dissolves the surfaces and fuses them together, becoming an integral part of the pipe. It's viscous enough to use even on loose fitting joints. *Schwartz Chemical Co.*

254—Anchor Pak is an interior packing material that keeps goods from shifting, cuts damage from bumps and bounce. Coating of pressure-sensitive adhesive on tips of exposed corrugations holds products firmly in place during handling. Material is available in sheet form. *Hinde & Dauch.*

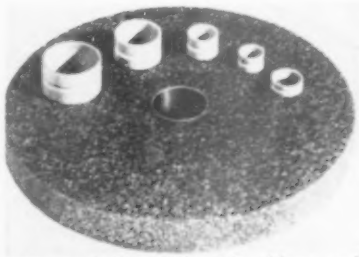


255—High-Temperature Core Tubes, rectangular and round, or coil forms without flanges, come in almost limitless sizes. Class "H" tubes are of laminated silicone glass cloth; Class "B" of laminated polyester or laminated epoxy glass cloth. *Silicone Insulation, Inc.*

256—Impregnating Varnish Remover works on all types of varnishes, whether air-dried or baked. The non-flammable fluid can be applied by either brush or dip. Immersion for 5 hours or less is said to remove accumulations up to two inches thick. *London Chemical Co.*

257—Abosite is an asbestos-base block insulation primarily for high-temperature vessels. From 1- to 4-in. thick. Two grades withstand temperatures of 1000 F. and 1850 F., respectively. Cushion action prevents powdering or shattering under vibration or impact. *Aber Co.*

258—Silicone Rubber Compounds of the room-temperature vulcanizing (RTV) type cure quickly, require no special equipment. Both have excellent electrical characteristics for use in encapsulation. No. 81726 shrinks 2% during cure; No. 81712 far less. *General Electric Co.*



259—Grinding Wheel Bushings and sleeves in Grade XX-13 are made from paper-base, phenolic resin laminated tube. Exhibit good dimensional stability even in wheels cured at temperatures above 300 F. May be used as reducing bushings. *Taylor Fibre Co.*

260—Transparent Adhesive (EC-1341) is designed for bonding paper labels to fiberboard, wood, steel, and galvanized iron. Second coat brushed over the label insures protection against abrasion, marring, and corrosive conditions, as well as water, oil, and high temperature. *Minnesota Mining & Mfg. Co.*

261—Rexplate Finish is prepared from Bakelite epoxy resins. This material produces a permanent brass-colored surface on plastic, sheet metal, or die cast parts. The three-step process cures to a coat that will not discolor and is highly resistant to scratching or cracking. *Rexton Finishes, Inc.*

262—Ultra-thin Foam Rubber (thicknesses down to 0.025±0.003 in.) comes in strips 1-in. wide by 24-in. long, or die-cut to specification. Open or closed cell types are available in oil-resistant, reinforced, firm, medium, and soft grades. *Otarion Listener Corp.*

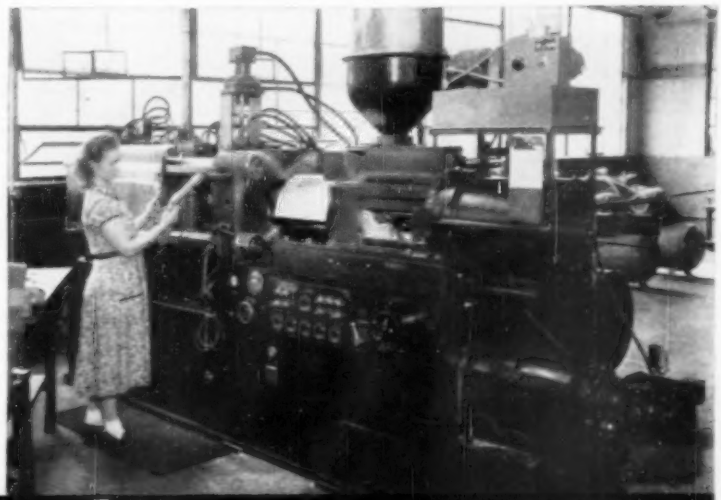
Turn the page

Plastic Molder

cuts water costs $4800 yearly

with an *Acme* FLOW-MIZER Cooling Tower!

At Wolverine Plastics in Milan, Michigan, large quantities of water are needed to remove excess heat from plastic injection molding machines operated through three shifts daily. This water is circulated through heat exchangers located in the oil baths which cool the machines during operation. Formerly, the water was discharged as waste after it had passed through the exchangers. Today this loss has been reduced by over 75%, thanks to an Acme FLOW-MIZER Cooling Tower which now cools the water and re-cycles it through the process. According to Mr. H. C. Haaxma, General Manager of the Wolverine Plant, the net savings in water costs will run to approximately $400 a month.



Above is one of several injection molding machines at Wolverine for which cooling water (that was formerly discharged as waste) is now re-cycled for use by the Acme Cooling Tower.

OTHER TYPICAL INDUSTRIAL PROCESSES

. . . in which Acme FLOW-MIZER Cooling Towers and Evaporative Coolers are effecting temperature control with outstanding economy include . . .

- PLATING & ANODIZING
- INDUCTION HARDENING
- INDUCTION SOLDERING AND WELDING
- COMPRESSOR COOLING
- DIE CASTING
- MACHINE TOOL OPERATIONS
- MILK PROCESSING
- BREWING

Whatever your industrial cooling problems, investigate the distinct advantages of Acme FLOW-MIZER Cooling Towers and Evaporative Coolers. Write today for Catalogs Nos. 311 & 361.

Note these features of the new Acme FLOW-MIZER Cooling Towers:

NEW LIGHT WEIGHT PAK is practically indestructible. Newly developed plastic Acme Pak effects drastic weight reductions (up to 93%), simplifies roof-top installations. Nothing to rust or rot. Removable for easy cleaning.

INSTALL INDOORS OR OUTDOORS. Quiet, big capacity blowers permit use of these towers with or without ductwork.

EASY ACCESS FOR SERVICING. External sump, sliding inspection doors, and removable front and rear panels make servicing quick and easy.

NO SURFACE MAINTENANCE NEEDED. All sections hot-dip galvanized after fabrication for life-long protection against rust.

ACME AIR CONDITIONING REFRIGERATION

Acme INDUSTRIES INC. Jackson, Michigan

Manufacturers of Quality Air Conditioning and Refrigeration Equipment since 1919

For more facts circle 627 on Reader Service Card

AIR AND MATERIALS MOVING... OR VENTILATION WITH TROUBLE-FREE EFFICIENCY

"Buffalo" Industrial Exhausters

For many years these rugged "Buffalo" fans have been noted for dependable performance in hundreds of tough industrial jobs. They efficiently handle fumes, gases, fogs and dust, at temperatures up to 900°F. — move a wide variety of materials, including those carried by pneumatic systems — deliver induced draft for small boilers.

"Buffalo" Industrial Exhausters bring you many advantages:

- Peak Performance — thanks to smoother, more efficient air flow resulting from new "Buffalo" improvements in rotor and casing design.
- Adaptability — optional equipment includes interchangeable air or material wheels and heat slinger for high temperature conditions. Housing is easily reversible or adjustable.
- Built for Severe Service — with all-welded steel plate construction, and oversize anti-friction bearings and shafts.

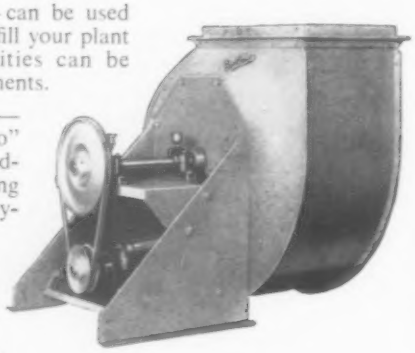
Write for Bulletin FI-110.

"Buffalo" Belted Vent Sets

These flexible "package" units are easily adaptable to your specific plant ventilating needs. They're economical to install, economical to operate. They're ideally suited for use in small, independent plant systems — for larger systems with variable requirements — for separate systems in different plant areas.

Check these advantages of "Buffalo" Belted Vent Sets:

- Compact, Easy-To-Install — can be used singly or as multiple units to fulfill your plant ventilating needs. Fan capacities can be adjusted to meet future requirements.
- Quiet, Efficient Performance — resulting from the famous "Buffalo" designed inlet vanes and backward-curved blades with non-overloading characteristic. Rotors are factory-balanced.
- Versatile — Capacities from 500 to 20,000 cfm. Available with all-weather drive cover for outdoor installation.



Write today for Bulletin 3720-A.

BUFFALO FORGE COMPANY
471 Broadway • Buffalo, N. Y.
Buffalo Pumps Division, Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

INDUSTRIAL EXHAUSTERS • BELTED VENT SETS • PROPELLER FANS • "E" BLOWERS — EXHAUSTERS

Begins on page 244

For more about these items, circle item numbers on Reader Service Card next to back cover.

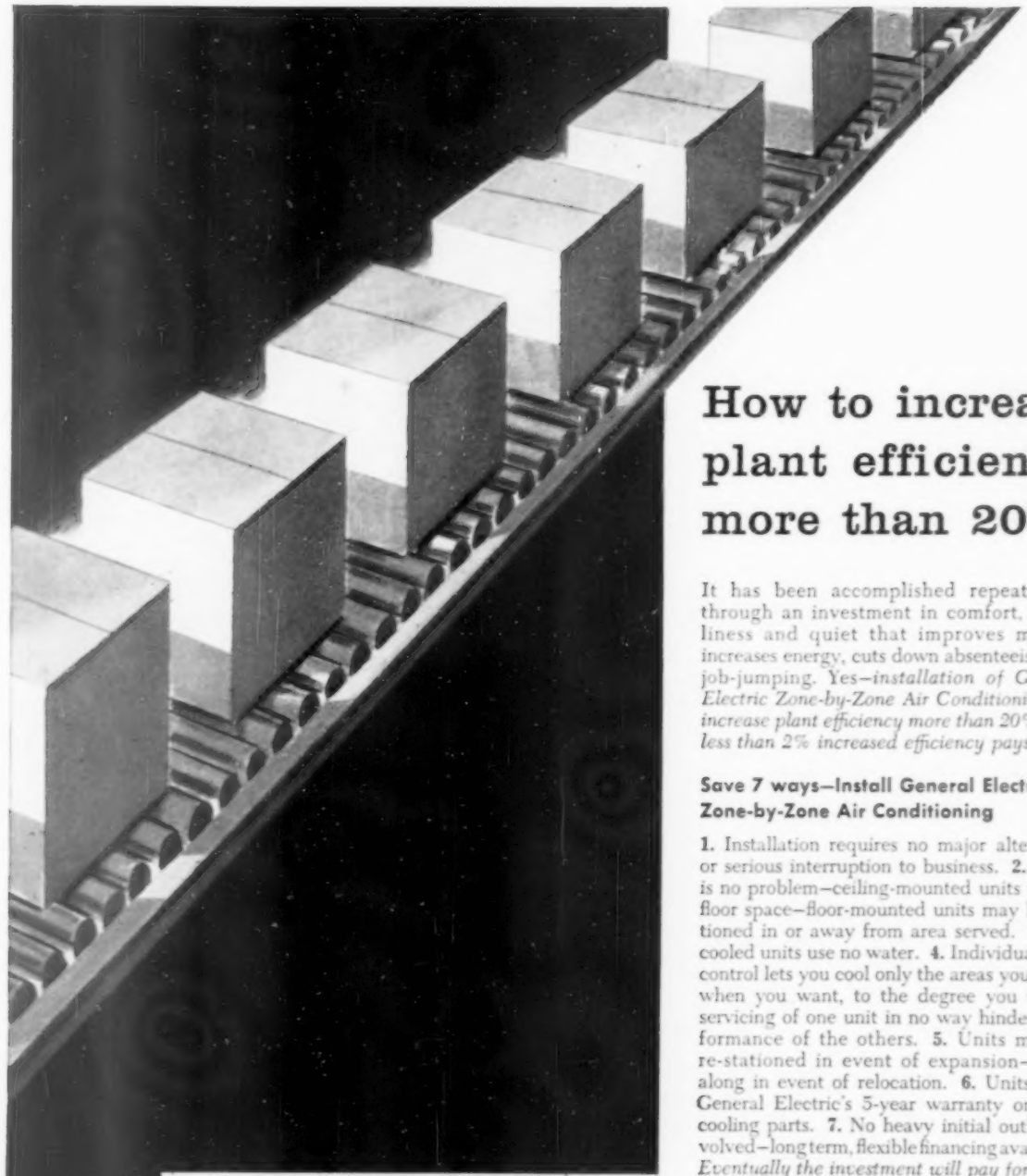
263—Height Blocks of magnesium or aluminum for tooling and pattern-making have tops 8 in. square accurate to 0.0001 in. Light weight is the big advantage—20-in. magnesium block weighs only 19.5 lb. Also available in 5-, 10-, 15-in. heights. *Challenge Machinery Co.*

264—Latex Concrete Patch eliminates need for chipping or edge-squaring. Powdered premix and liquid latex are combined, must be used within one hour. Use indoors or out to repair cracks, holes, spalls in concrete, and for non-shrinking pointing up of joints. *Flintkote Co.*

265—MightyPlate is the name for a cold-process asphalt roofing compound. The trace quantities of metals in conventional asphalts have been converted to minerals, adding to pliability, ductility, and adhesiveness. Can be applied directly from shipping container without heating. *Panther Co.*

266—Heavy-Duty Enamel, for extreme resistance to heat, cold, acids, alkalis, and chemical fumes, also resists cracking even under hammer blows. M & F Enamel is particularly well suited to machinery surfaces under constant vibration. *American Marietta Co.*

267—Froil is a rust-preventive oil that eliminates water-spotting of polished and machined parts after



How to increase plant efficiency more than 20%

It has been accomplished repeatedly—through an investment in comfort, cleanliness and quiet that improves morale, increases energy, cuts down absenteeism and job-jumping. Yes—*installation of General Electric Zone-by-Zone Air Conditioning can increase plant efficiency more than 20%—and less than 2% increased efficiency pays for it.*

Save 7 ways—Install General Electric Zone-by-Zone Air Conditioning

1. Installation requires no major alterations or serious interruption to business. **2.** Space is no problem—ceiling-mounted units use no floor space—floor-mounted units may be stationed in or away from area served. **3.** Air-cooled units use no water. **4.** Individual zone control lets you cool only the areas you want, when you want, to the degree you want—servicing of one unit in no way hinders performance of the others. **5.** Units may be re-stationed in event of expansion—taken along in event of relocation. **6.** Units carry General Electric's 5-year warranty on vital cooling parts. **7.** No heavy initial outlay involved—long term, flexible financing available. *Eventually the investment will pay for itself.*

We will welcome an opportunity to tell you more about General Electric Zone-by-Zone Air Conditioning. Mail coupon today. General Electric Company, Commercial and Industrial Air Conditioning, 5 Lawrence Street, Bloomfield, N. J.

Progress Is Our Most Important Product

GENERAL ELECTRIC

In Canada, Canadian General Electric Co., Ltd., Montreal

General Electric Company FM-458
Commercial and Industrial Air Conditioning Dept.
5 Lawrence St., Bloomfield, N. J.

Please send me free booklet on General Electric Zone-by-Zone Air Conditioning.

Name_____

Firm Name_____

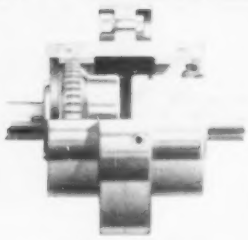
Address_____

City_____ Zone____ State_____

For more facts circle 629 on Reader Service Card

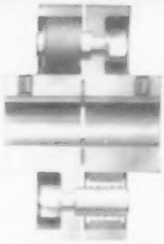
It pays to Specify

AJAX The World's Most Complete Line of FLEXIBLE COUPLINGS



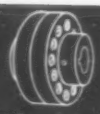
AJAX DIHEDRAL COUPLINGS

AJAX Patented Dihedral tooth shape handles angular and offset misalignment up to 12 degrees.



AJAX RUBBER-BRONZE CUSHIONED COUPLINGS

Safeguard your machines against costly shutdowns. Standard of industry for 37 years. All types and sizes.

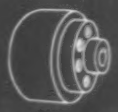


Ajax Type A Semi-Steel and Type S Forged Steel Couplings

Ajax Type SP Shear Pin Coupling

Ajax Type BO Bolt-On Coupling

Ajax Type M Mill Motor Coupling



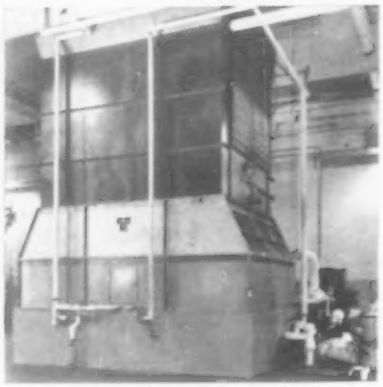
Ajax Type BD Brake Drum Coupling

Write for Ajax Technical Catalogs. Representatives from coast to coast.

AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, NEW YORK
Also manufacturers of Ajax vibrating conveyors, screens and packers.

For more facts circle 630 on Reader Service Card

WHEREVER YOU NEED TO COOL A FLUID... and have a problem of water supply or disposal... use NIAGARA "AERO" HEAT EXCHANGER



▶ Evaporating a very small amount of water in an air stream you can cool liquids, gases or vapors with atmospheric air, removing heat at the rate of input, controlling temperature precisely. Save 95% of the cost of cooling water; save piping, pumping and power. You quickly recover your equipment cost.

You can cool and hold accurately the temperature of all fluids, condense vapors, cool water, oils, solutions, intermediates, coolants for mechanical, electrical or thermal processes. You have a closed system free from dirt. You have solved all problems of water availability, quality or disposal, maintenance expense is low.

You may apply this to solvent recovery, vacuum systems controlling reactions, condensing distillates, cooling reflux products.

For more information, write for Bulletins 120, 124, 135. Address Dept.

NIAGARA BLOWER COMPANY
Dept. F-4 405 Lexington Ave., New York 17, N. Y.
Niagara District Engineers in Principal Cities of U. S. and Canada

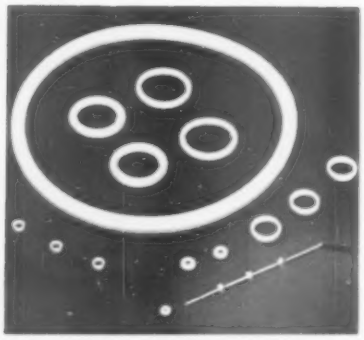
For more facts circle 631 on Reader Service Card

FACTORY / MATERIALS NEWS
Begins on page 244

For more about these items, circle item numbers on Reader Service Card next to back cover.

alkali or emulsion degreasing and rinsing. Also protects against oxidation and tarnishing. Apply by dip immersion, spray, wiping, or brushing. *Octagon Process, Inc.*

268—Amazite protects new or old concrete, terrazzo, brick, metal, and wood against acids and caustics. Can be applied by trowel, brush, or spray gun to make either glossy or skidproof surface. Hardens overnight into abrasion-resistant finish that will stand heavy traffic. *Hallemite Mfg. Co.*



269—Teflon "O" and "V" ring seals are now being made with dimensional tolerances of 0.001 in. and less. With "wall" thickness down to 0.062 in. (0.012 on special order), the rings have a maximum OD of 15/16 in. Designed for extreme temperatures and pressures. *Tri-Point Plastics, Inc.*

270—Ambraze No. 411 is a low-fuming bronze brazing rod for general-purpose welding and brazing work. Available in five diameters (1/16 to ¼ in.), the rods have a low melting point (1575 F.) for free flow, yet produce weld deposit of 70,000-psi. tensile strength. *American Brazing Alloys Co.*

271—Application of a non-abrasive friction surface to virtually any material in any location is provided by a new product. It provides cushioning and high slip resistance, absorbs noise, is non-sparking, gives long wear. *California Industrial Development Co.*

For more facts circle 632 on Reader Service Card ▶

11 times as much material removed 13 times faster than by hand!

Give your job a finished look with a Black & Decker Bushing Tool.

For the finest, and fastest work always specify genuine Black & Decker forged hammer tools.

Trenches for conduit are a cinch with a Black & Decker Cold Chisel.

Look for Swifty Service at one of B&D's 48 Factory Service Branches. There's one near you.

B&D 1⅛" Hammer drastically cuts cut-through time—labor costs!

Add a Black & Decker 1⅛" Hammer to your tool kit and watch how quickly it opens up your profit margin! It punches through concrete walls in minutes—opens the way for pipe and duct in a fraction of the time it takes by hand.

Plugs into any convenient outlet—the Black & Decker Electric Hammer takes on chipping, gouging, digging, caulking, pointing, and many other jobs! Mail coupon today for a free demonstration on your job-site! If additional information is desired just check the box.

Leading Distributors Everywhere Sell

Black & Decker

Quality Electric Tools—Power-built to set the pace

MAIL TODAY FOR FREE DEMONSTRATION

THE BLACK & DECKER MFG. CO., Dept. 0704, Towson 4, Md.
(In Canada: Brockville, Ontario.)

☐ Please arrange a demonstration of your 1⅛" Hammer.
☐ Please send me additional information on tools checked.

Name ..... Title .....

Company .....

Address .....

City ..... Zone ..... State .....

☐ Portable Grinders ☐ Drills ☐ Shears ☐ Jig Saws

degreasing compounds last up to **4 TIMES LONGER** with a **PUROLATOR** filter

You'll spend up to 60% less on degreasants when you filter them with a Purolator filter. The filter traps most of the contaminants, so the compound lasts up to 4 times longer. You just change the filter instead of changing the compound—much easier and much cheaper.

The compounds stay like new longer because the filter picks up the contaminants as soon as they appear, prevents them from cutting down on degreasing efficiency.

Original installation of the filter is simple, too. The motor and pump that circulate the degreasing fluid will also pump the compounds through the filter.

This is just one of the ways Purolator can help reduce operating costs and improve product quality. For further details contact your nearest Purolator Industrial Sales Agent, or the Purolator Industrial Sales Division, Rahway, N. J.

Filtration For Every Known Fluid

PUROLATOR

PRODUCTS, INC.

RAHWAY, NEW JERSEY AND TORONTO, ONTARIO, CANADA

ADVERTISERS' LITERATURE

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

MATERIALS HANDLING

346—Chain Blocks. Bulletins 15010-10, 15010-16, 15010-17, 15010-18 now available. Manning, Maxwell & Moore, Inc.

347—Airstream Conveyors. Brochure (32 pages) gives detailed information on bulk materials handling. Dracco Co.

348—Truckster. New booklet describes features of light load and personnel carrying truck. Cushman Motor Works.

349—Screw Conveyor Components. Folder 2489 describes features of new line of accessories. Link-Belt Co.

350—Flexible Tubing. Booklet "Flexineering" gives types, sizes for conveying. Pennsylvania Flexible Metallic Tubing.

351—Towveyor. Bulletin 28 and Catalog 157 describe electronically controlled system. Jervis B. Webb Co.

352—Electric Trucks. Booklet now available: "Gas vs. Electric Industrial Trucks." Elwell-Parker Electric Co.

353—Safety Hook. Data sheet upon request. Gives sizes of all types of hoists, tuggers, come-alongs. E. D. Bullard Co.

354—Slotted Angle. Idea book contains ideas-in-use. Shows varied applications for storage. Acme Steel Co.

355—Fork Truck. Bulletin now available on reach-fork truck in 2000-, 3000-lb. capacities. The Raymond Corp.

356—Palletainers. Catalog gives detailed information on sizes, capacities, applications. Union Steel Products Co.

357—Slotted Angle. Catalog describes new slotted angle to fill every framing need. Republic Steel Corp.

358—Shelving, Shop Equipment. Catalog covers complete line of steel shelving, shop equipment. Borroughs Mfg. Co.

359—Belt Conveyors. Catalog 856 and Bulletin G.P53 on complete general-purpose line. Mathews Conveyer Co.

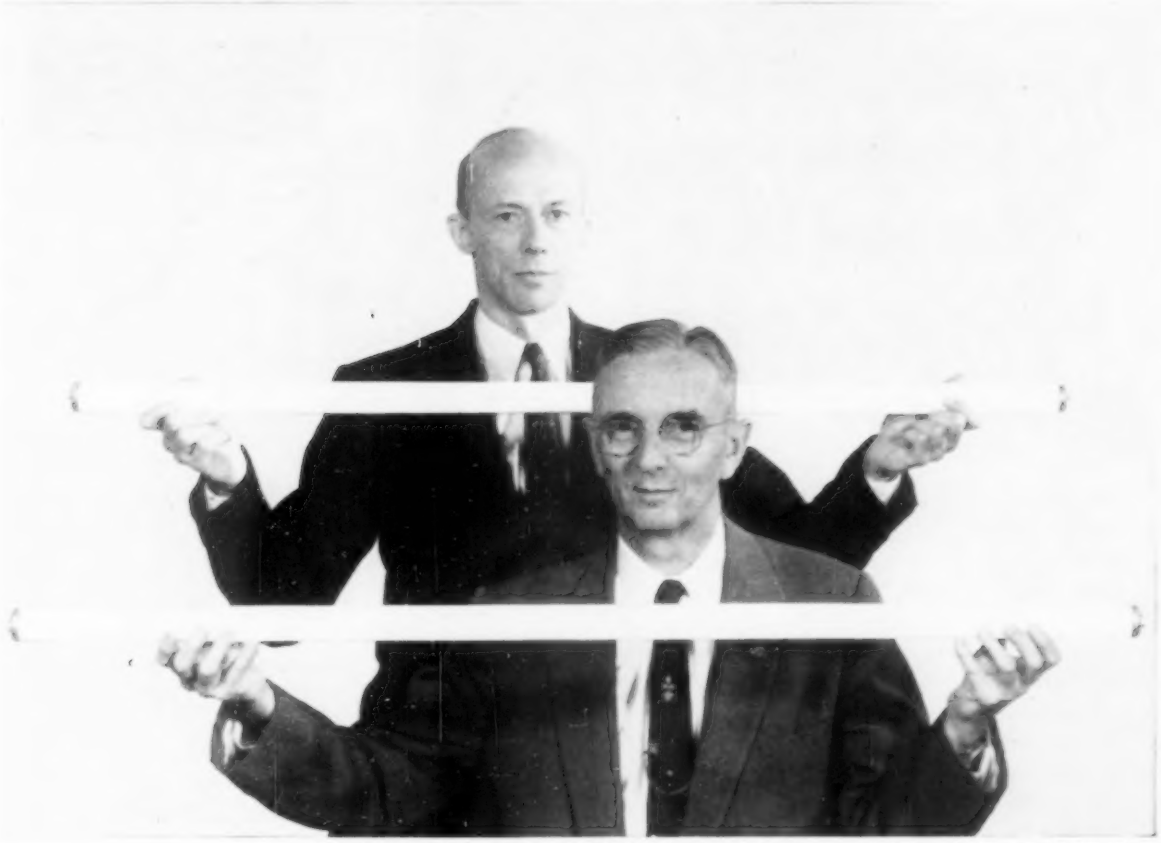
360—Boxes. Information on construction features, applications, and savings of collapsible boxes. Republic Steel Corp.

361—Steel Shelving. Catalog 30 gives specifications, construction features, applications. DeLuxe Metal Furniture Co.

Turn the page

For more facts circle 633 on Reader Service Card

GENERAL ELECTRIC'S 20th FLUORESCENT ANNIVERSARY ANNOUNCEMENT:



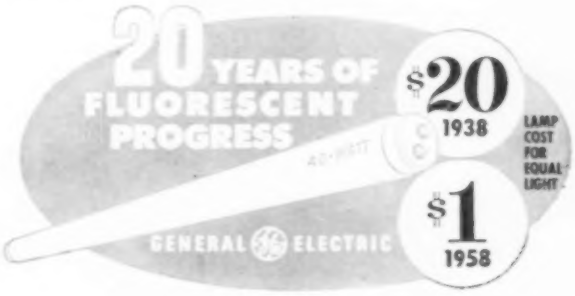
R. N. THAYER (left) AND G. E. INMAN developed first commercial fluorescent lamp in the U.S.A. in 1938. Still with General Electric, they have been key men in many G-E fluorescent lamp improvements.

Today's G-E Fluorescent Lamps give you 76% more light per watt, last 5 times longer ...yet cost ½ as much!

The first fluorescent, introduced 20 years ago this month by General Electric, can't hold a candle to today's G-E 40-watt Rapid Start and Pre-Heat Lamps. A steady stream of improvements from G.E. has provided up-to-the-minute lighting systems for G-E Lamp users. Total light output is up nearly 9 times, rated life is 5 times longer, and the list price is down 57%! *This means one G-E Fluorescent Lamp dollar today buys as much light as $20 did 20 years ago!*

NEWEST IMPROVEMENT—"BONUS PHOSPHOR". This revolutionary new G-E process gives you 7 to 9% more light by selecting only the bigger, brighter phosphors to be used in G-E Lamps. It is another dollar-and-cents reason why you get more for all your lighting costs with General Electric Lamps.

For more facts on the "Bonus Phosphor" and what it means in saving you capital *and* operating costs, write: General Electric Co., Large Lamp Dept. FMM-48, Nela Park, Cleveland 12, Ohio.



Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts circle 634 on Reader Service Card

Campbell "Customized" Sling Chains

PUT THE ASSEMBLY YOU NEED "YESTERDAY" ON THE JOB TODAY!

Now, the new Campbell "Customized" Sling Chain Assembly Program gives you sling chains as you want them . . . when you want them. Here's how this fast, flexible service works for you. You can: a) maintain your own stock of Campbell component parts; and assemble slings right on-the-job; b) get immediate delivery on assemblies and components from your Campbell Distributor; c) get immediate shipment ordered through your Campbell Distributor on slings made-up at the nearest Campbell Warehouse or Factory.

Campbell Certificate of Test:
Guarantee of Performance

Campbell Certificates of Test protect you both for Campbell component parts, and the complete "Customized" Assemblies you get from your Campbell Chain Distributor or Warehouse. Call your Distributor for details on how the Program meets the requirements of *your* operation.

SEND TODAY for your free copy of Campbell's "Customized" Sling Chain Brochure No. CSA-1.

CAMPBELL CHAIN

CAMPBELL CHAIN *Company*

York, Pa.—W. Burlington, Iowa
E. Cambridge, Mass.—Seattle, Wash.—Portland, Ore.
Sacramento, San Francisco, Los Angeles, Calif.

ADVERTISERS' LITERATURE

Begins on page 252

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

362—Crane. Certified Gould Report 5707 cites cost-saving features of hydraulic cranes. Austin-Western Co.

363—Storage Racks. Catalog lists over 800 different sizes and capacities of racks. American Metal Products Co.

364—Electric Trucks. Case histories of paper (276-1), coils (349-1), housewares (507-1). Lewis-Shepard Products, Inc.

365—Scales. New weight-fact kit available on request. Aid in controlling weighing costs. Toledo Scale Corp.

366—Dial Scales. New catalog gives complete specifications on standard and special types. Howe Scale Co.

367—Casters. Catalog, sent on request, describes new and unusual applications and adaptability. The Bassick Co.

368—Materials Handling. Free picture newspaper available on new materials handling ideas. Rapid-Standard Co.

PRODUCTION

369—Slitter and Rewinder. Information and application data on custom-engineered machine. Hobbs Mfg. Co.

370—Punched-Card Controls. Illustrated folder contains examples of punched-card controls reports. Royal McBee Corp.

371—Magnetic Separators. Drawings and technical literature on new magnetic separator. Commercial Filters Corp.

372—Joining Strips. Complete data on 90 and H joining strips for PVC Sheet Stock. Colonial Plastics Mfg. Co.

373—Speed Variator. Bulletin GEA-6643 list mechanical data on new speed variator. General Electric Co.

374—Air Tools. Catalog A-10 gives complete information on entire line of abrasive tools. Buckeye Tools Corp.

375—Impact Wrench. Literature covers new ½-in. square-drive, reversible, high-speed wrench. Aro Equipment Corp.

376—Cleaning and Finishing. Data on machinery applications. Cincinnati Cleaning & Finishing Machinery Co.

377—Finishing. Literature on better ways to cut finishing costs and increase production. Conforming Matrix Corp.

378—Automatic Bar Machines. Copy of "Automatic News" mailed regularly as issued. Greenlee Bros. & Co.

Turn the page

You get all 5 with Polyken® masking tape

2. Quick adhesion
Sticks tight with only a slight touch . . . won't slip or curl back. Resists moisture, too.

3. Conformability
Flexible even on extreme curves. Crepe backing gives extra stretch needed at sharp angles without being rough on the hands.

4. Extreme thinness
No paint build-up during spraying operations.

1. Easy unwind
Saves time . . . comes off roll without hard pull. Tears crosswise readily.

5. Clean pull-off
Unaffected by forced heat drying. Leaves sharp edge without any sticky residue.

THIS ONE TAPE GIVES YOU FINEST CREPE MASKING QUALITY . . . PLUS ECONOMY FOR ANY JOB.

Find Your Nearest Distributor in The 'Yellow Pages'

For help with your taping job—look up the Polyken Industrial Tape Distributor nearest you, or write to the Polyken Sales Division, 309 W. Jackson Blvd., Chicago 6.

Polyken®
INDUSTRIAL TAPES
THE KENDALL COMPANY
Polyken Sales Division

For more facts circle 636 on Reader Service Card

"WORLD'S MOST RESPECTED MOTOR"

And no wonder . . .
because Brook A. C. Motors have gone quietly about their business, dependably delivering power to industries around the world for over half a century.

A look at the service charts and maintenance records of hundreds of users shows why the Brook has become the "Worlds Most Respected Motor". All standard types . . . 1 to 600 HP . . . warehouse stocks, ready for shipment, and Factory Representation in major industrial centers. Send for brochure and name of your local Brook Dealer.

world's most respected motor

BROOK MOTOR CORPORATION

3553 W. PETERSON AVE., CHICAGO 45, ILLINOIS

SINCE 1904 BROOK MOTOR CORPORATION

For more facts circle 637 on Reader Service Card

THERE'S WORK IN YOUR PLANT FOR THIS NEW *Lightweight* HOIST!

Philadelphia ARMY TYPE ALUMINUM TROLLEY HOIST

New Model "R". Originally developed for Government services to meet following requirements: Heavy duty yet light in weight; fully adjustable to wide range of I-beams and patent track monorail systems; less headroom than standard Army Type Hoists. Made of aluminum, and available push type or geared. Capacities: ½ to 2 tons.

TROLLEYS • CRANES • CHAINS
CHAIN HOISTS OF ALL TYPES

PHILADELPHIA CHAIN HOISTS

SPEC. MATERIALS HANDLING EQUIP. Write for Catalog 1158

***Philadelphia* HOIST DIVISION**
OF INDUSTRIAL ENTERPRISES, INC.
DOYLE and HAMILTON STREETS • DOYLESTOWN, PA.
SALES OFFICES and WAREHOUSES IN NEW YORK • CHICAGO • LOS ANGELES

ADVERTISERS' LITERATURE

Begins on page 252

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

379—Schedule Board. Booklet X-400 shows varied practical applications of visual control board. Graphic Systems.

380—Tool Control. Free booklet, "How Tool Costs Were Cut 12 Ways in 20 Plants." McCaskey Industrial Div.

381—Electrostatic Painting. Brochure No. 2 cites practical examples and scope. Ransburg Electro-Coating Corp.

382—Heat Transfer. Bulletin P-60 entitled "How to Cut Heat Transfer With Plate-Coil." Tranter Mfg. Co.

383—Pillow Blocks. Technical bulletin describes precision-built types for specific job duty. Dodge Mfg. Corp.

384—Power Transmission. Catalog (320 pages) gives complete technical data on line of mchinery. Dodge Mfg. Corp.

385—Welding. Bulletin 7000.1, now available, describes improved Fleetweld 47 electrode. Lincoln Electric Co.

PLANT BUILDINGS

386—Complete Buildings. Catalog gives information on structural features and financing plan. Stran Steel Corp.

387—Smokestacks. Bulletin SS-202 gives helpful facts on installation of glass-protected stacks. A. O. Smith Corp.

388—Flooring. Descriptive folders on vinyl floor tile give colors, sizes, thicknesses. Azrock Floor Products Div.

389—Roofing. Booklet "Things You Should Know About Your Roof" with Survey Plan. Johns-Manville Corp.

390—Steel Equipment. New 84-page catalog illustrates diversified line of steel equipment. Lyon Metal Products, Inc.

391—Wire Glass. Catalog 58-1 fully describes fire safety features of wire glass. Mississippi Glass Co.

392—Rolling Steel Doors. Catalog G-58 gives specifications, applications, and types available. The R. C. Mahon Co.

393—Complete Buildings. Bulletin describes structural features, sizes, applications. Republic Steel Corp.

394—Fir Plywood. Data offered on specific plywood uses and specifications. Douglas Fir Plywood Association.

395—Building Products. Book on aluminum building products and materials available. Aluminum Co. of America.

Turn the page

Get the most out of

Power-Groove with Day-Brite

CFI-15 fixtures for two 8-foot Power-Groove lamps furnish 60 foot-candles in high-bay areas of the All-Steel Equipment Co., Aurora, Ill. Under balconies, CFI-10 fixtures for High-Output Rapid-Start Lamps are used. HATFIELD ELECTRIC CO., *Electrical Contractor.*

Take advantage of the greater light output provided by Power-Groove lamps—*plus* the traditional installation and maintenance economies built into every Day-Brite fixture.

You get *both* when you install Day-Brite CFI (Comfort For Industry) industrial fixtures designed specifically for Power-Groove lamps.

Whether you have a high-, medium- or low-bay lighting problem, there's a Day-Brite CFI fixture to fit your requirements. For information, call your Day-Brite representative listed in the Yellow Pages, or write for Power-Groove booklet.

Z-151

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

Day-Brite Lighting, Inc., 6240 N. Broadway, St. Louis 15, Mo.
Day-Brite Lighting, Inc., of Calif., 530 Martin Ave., Santa Clara, Calif.

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

For more facts circle 639 on Reader Service Card

3 MIKRO-D ACCESSORIES FOR PROCESS EQUIPMENT

MIKRO AIRLOCKS PRE-CRUSHERS FEEDERS

Mikro Airlocks, Pre-Crushers, and Feeders are three Mikro-D accessories designed for specific requirements on Mikro products or other process equipment.

MIKRO AIRLOCK

MIKRO AIRLOCK is a rotary valve to provide continuous discharge or feed of dry material. May be operated under slight pressure or vacuum. When used at the discharge of Mikro products, it provides absolute assurance against dusting. Adaptable for many applications where material is fed or discharged from bin or conveyor. (Bulletin 54A)

MIKRO PRE-CRUSHERS

MIKRO PRE-CRUSHERS are furnished in single or double roll units, depending on material to be pre-crushed. In some instances, unit can be placed immediately over the feed screws of the MIKRO PULVERIZER with excellent results. Other applications require a surge hopper between pre-crusher and feed screws, particularly if material varies from powder to large lumps, and if magnetic separator is to be used.

It is usually desirable to handle pre-crushing and pulverizing as one operation, in one unit. Normally the pre-crushers are designed for soft or semi-hard crushing operations.

MIKRO FEEDER

MIKRO FEEDER for powders or all flow characteristics, hard granular materials, spherical pellets, wet oily or pasty materials with as high as 40% moisture content, and other hard to handle materials.

Provides wide variation in feed rate, from 0 to 100% in minute increments, with 1 to 5% accuracy, depending upon uniformity of material. Permits continuous feeding.

Feeding rate from 25 grams minimum to 100 lbs. per minute, or tons per hour. Hopper capacity to 300 cu. ft. Unit available with steel or stainless steel construction. (Bulletin 54B)

Mikro-D PULVERIZING MACHINERY DIVISION

METALS DISINTEGRATING COMPANY, INC.
24 Chatham Road • Summit, New Jersey

MANUFACTURERS OF PULVERIZING, AIR CONVEYING AND DUST COLLECTION EQUIPMENT

circle 640 on Reader Service Card

ADVERTISERS' LITERATURE

Begins on page 252

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

396—Roof Deck. Manufacturer suggests writing for information on fire-stopper roof deck. Bestwall Certain-Teed.

397—Fence. Free brochure, now available on request, on all-aluminum chain link fencing. Reynolds Metals Co.

ELECTRICAL

398—Switchgear. Complete data on features of low-voltage switchgear. Allis-Chalmers Mfg. Co., Power Equip. Div.

399—Switchboards. Descriptive bulletin shows mechanical features of new front-connected switchboard. Square D Co.

400—Synchronous Motors. Bulletin 1900 gives sizes, mechanical modifications, applications. Louis Allis Co.

401—Motors. Complete facts available on full line of totally enclosed electric motors. Westinghouse Electric Corp.

402—Electric Control. Bulletins ECS-56, control switches; EM-51, limit switches; EM-52A, solenoids. National Acme Co.

403—Controls. Bulletin GEA-6603 gives full details on supervisory control equipment. General Electric Co.

404—Conductor Systems. Catalog now available describes mobile electrification systems for plants. Insul-8-Corp.

MAINTENANCE

405—Rustproofing. Catalog gives complete specifications on damp-proof red primer for rust prevention. Rust-Sele Co.

406—Lubricants. Booklet: "Management Practices That Control Costs via Organized Lubrication." The Texas Co.

407—Repair Services. Bulletins GED-3465 and GED-3278 describe electric repair service. General Electric Co.

408—Stepladders. Catalog (20 pages) describes complete line of equipment for above-floor work. Ballymore Co.

409—Lubrication. Complete catalog shows full line of industrial lubrication equipment for plant use. Alemite Div.

410—Floor Machines. Literature on full line of gas or electric scrubber-vacuum machines. Finnell System, Inc.

411—Rustproofing. Report (30 pages) on rust-penetration properties of damp-proof red primer. Rust-Oleum Corp.

Turn the page

PIPE—All Your Needs

For the fastest service on *ANY* pipe order—especially for the unusual or hard-to-get sizes . . . make just one call to your nearest Foster office. Tested and structural stocks, ½" to 48", all walls and all specs for every purpose. Also valves and fittings from warehouse stocks. Send for free catalogs and ordering guides.

Complete Contractor Service—Since 1901

L. B. FOSTER CO.

PITTSBURGH 30 • ATLANTA 8 • NEW YORK 7
CHICAGO 4 • HOUSTON 2 • LOS ANGELES 5

circle 641 on Reader Service Card

IF you change your address,

please be sure to let us know promptly. It takes time to correct the stencil addressing plate. And we don't want you to miss copies of FACTORY.

Also....

be sure to give us *both*

(1) your OLD address
and
(2) your NEW address.

We need them *both* to make the change—*also confirmation of your company connection and position.*

FACTORY
Management and Maintenance
330 W. 42 St., New York 36, N.Y.

Powerful Fordson Major Diesel Works "Low and Inside" for 75c a Day!

FORD LETS YOU DIG
anywhere you can swing a bucket!

Tight corners, low beams, close quarters of any kind are taken in stride by mobile, maneuverable Ford Tractors. Economical *new* Ford Workmaster, husky *new* Ford Powermasters, fuel-thrifty *new* Ford Diesels and *new* Fordson Major Diesels—all are engineered with clean, compact lines for easy handling in cramped areas. They offer big power in a small package for digging inside footings or machine pits, for setting and backfilling tanks, for in-plant towing, loading, materials handling and dozens of other jobs.

But that's only part of the Ford story, of course. The same tractors can be put to work *outside* the plant on an almost endless number of jobs with half a hundred time, labor and money-saving attachments. The great new line of Ford Tractors offers a choice of standard or "live" power take-off, four or five speed transmission, or an auxiliary transmission giving 12-speed mobility. Get all the facts from your nearby dealer, or write to Industrial Sales Department, Tractor and Implement Division, Ford Motor Company, Birmingham, Michigan.

YOU SEE MORE FORDS BECAUSE THEY SAVE MORE MONEY!

For more facts circle 642 on Reader Service Card

Smart Plant Managers Say!

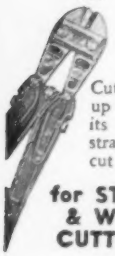
"OUR HANDIEST" (and lowest-cost) MAINTENANCE 'WORKERS' are HKP® PORTER CUTTERS

They Handle Just About Every Tough Metal - Cutting Job — *FAST!*

Some maintenance superintendents discovered the powerful, efficient PORTER CUTTERS performing miracles in their plants' production departments — and threw away the old fashioned, slower tools that were keeping maintenance metal-cutting labor costs sky high. Others — on the alert for better ways to handle maintenance work have found that PORTER CUTTERS are capable of exerting up to 20,000 pounds of cutting pressure, enough to cut ⅝" steel rod with ease, and reached the same labor-saving maintenance goal. How about you? Have you looked over — or *overlooked* the PORTER CUTTER potential in your maintenance department?

Illustrated Above — is the world's most popular (because it is the world's most efficient) all-round metal cutter . . . the PORTER CENTER-CUT CUTTER. In 8 sizes — up to ¾" capacity.

for THAT *RUGGED* WORK PORTER HEAVY DUTY CUTTER



Cuts almost anything in metal — up to ¾" diameter — thanks to its heat-treated, heavy-forged straps, and hard-tempered, center cut type jaws. Available in 3 sizes.

for STRAP & WIRE CUTTING

PORTER 990T STEEL STRAP CUTTER

Shear-cut, parrot-type jaws make this powerful, speed-action tool tops for cutting steel strapping ¾" x .035" and wire binding up to 14 gauge. Other sizes available

WRITE FOR CATALOG — showing 108 different cutters, that handle metal-cutting jobs better!

Contact your Industrial Distributor for Service.

H. K. PORTER, Inc.
Somerville 43, Mass.

ADVERTISERS' LITERATURE . . . *Begins on page 252*

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

412—Floor Machines. Data on new high-speed automatic scrubbing, dry-cleaning machine. Advance Floor Machine Co.

413—Lubricants. Free data book gives valuable treatise on lubrication. Lubriplate Div., Fiske Bros. Refining Co.

414—Pipeline, Drainage Cleaner. Literature gives info on flow line and drain cleaning machine. Kollmann Mfg. Co.

415—Bearing Bronze. Data on continuous-cast bearing bronze—solids, tubes. American Smelting & Refining Co.

416—Telescopers. Complete catalog now available on custom-built Hi-Reach telescopers. Economy Engineering Co.

417—Floor Surfacing. Data on new mineral-coated fabric for floors, stairs, and walkways. Minnesota Mining & Mfg. Co.

418—Waterproofing. Free literature, "How To Do It," about plant floors and walls. Standard Dry Wall Products, Inc.

419—Floor Cleaner. Information on care of concrete, wood, asphalt tile, terrazzo floors. Multi-Clean Products, Inc.

PLANT SERVICES

420—Paging System. Complete information on new selective paging system for use in industry. Stromberg-Carlson Co.

421—Valves. Bulletin V-8 fully describes operating features of diaphragm-operated valve. Seely Instrument Co.

422—Water Filters. Bulletins 651 and 909, now available, provide complete data and applications. R. P. Adams Co.

423—Shock Absorbers. Manual SA gives details for controlling flow-stoppage shocks. Josam Mfg. Co.

424—Compressors. Bulletins 16B8244, 16B8162 give data on 12 sizes of rotary compressors. Allis-Chalmers Mfg. Co.

425—Dust Collectors. Illustrated folder lists complete line and sizes for varied applications. Aget Mfg. Co.

426—Air Conditioners. Catalog (72 pages) gives complete technical data on new central-station types. Carrier Corp.

427—Valves. Catalog No. 900 illustrates varied line of diaphragm-type valves for fluids control. C. A. Norgren Co.

428—Washrooms. Booklet contains diagrams, illustrations, ideas on washroom advisory service. Scott Paper Co.

429—Heat Exchangers. Bulletins 120, 124, 135 give complete data on Aero heat exchanger. Niagara Blower Co.

430—Compressors. Complete information available on 200-hp. high-capacity compressor. Gardner-Denver Co.

431—Piping Layouts. Volume 3, 36-page book, illustrates 25 basic piping diagrams and layouts. Jenkins Brothers.

432—Fire Pumps. Bulletins 5814F (horizontal) and 6920F (vertical) describe fire pumps. Fairbanks, Morse & Co.

433—Compressors. Bulletin M-152 covers new compressor line and lists capacities. Davey Compressor Co.

434—Two-Way Radio. Complete information offered on new transistorized dispatcher radio. Motorola, Inc.

MISCELLANEOUS

435—Time Recorders. Folder lists line of mechanical and electrical models and applications. Service Recorder Co.

436—Graphic Instruments. Bulletins and case histories show wide variety of applications. Esterline-Angus Co.

437—Industrial TV. Illustrated brochure describes complete ITV equipment and systems. Philco Corp.

438—Shipping Labels. Free bulletin now available on facsimile label system on cartons. Weber Marking Systems.

439—Protective Gloves. New catalog lists range of styles, materials, sizes and prices. Pioneer Rubber Co.

440—Packaging Paper. Booklet describes packaging paper for protection of products. American Sisalkraft Corp.

441—Reproduction Materials. Free copy of booklet on reproduction materials now available. Eastman Kodak Co.

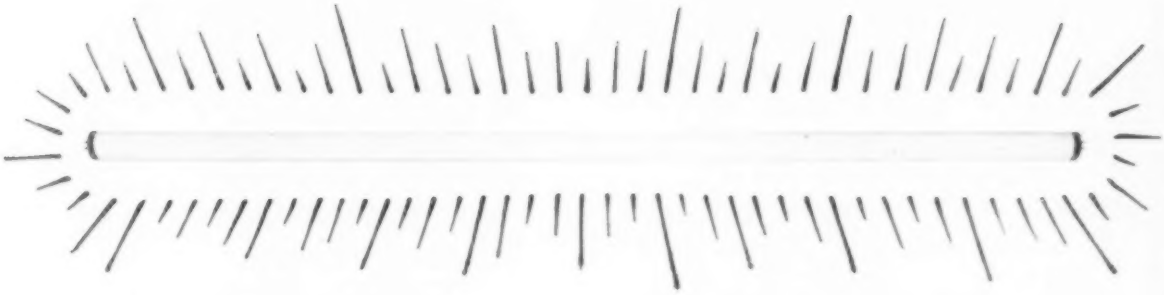
442—Training Films. New catalog, titled "Films For Industry," available upon request. United World Films, Inc.

443—Reproduction Materials. Literature available on tri-acetate sheet for reproduction. Stampat Co.

444—Industrial TV. Complete information available on closed-circuit industrial television. Allen B. Dumont Labs.

445—Dust Collectors. Bulletin 231-12 describes new in-duct types and successful installations. Joy Mfg. Co.

Goodbye, "Dead-Ends"!



Westinghouse lamps stay bright from end to end... l-o-n-g-e-r !

"ULTRALUME" phosphors coat the inside of all Westinghouse fluorescent lamps. Only Westinghouse has "Ultralume"...the phosphors that assure maximum brightness for the life of the lamp.

Banish light-robbing, unsightly "dead-ends" on your fluorescent lamps. Next time, use Westinghouse lamps with exclusive "Ultralume"™ phosphors and new chrome vanadium alloy leads. The combination of revolutionary new leads and Ultralume phosphors make Westinghouse lamps give maximum light longer and keep them bright end to end!

Save money, too! Lamp for lamp, Westinghouse fluorescents give more light for the same wattage. You get more light per foot . . . more light per dollar!

Specify Westinghouse on every lamp order. Call your local authorized Westinghouse agent or write—Westinghouse Lamp Division, Bloomfield, N. J.

YOU CAN BE SURE...IF IT'S

Westinghouse (W) FLUORESCENT LAMPS

For more facts circle 644 on Reader Service Card

Hobbs Slitter and Rewinder at
Sullivan Paper Co., West Springfield, Mass.

"Highly Efficient"...

SULLIVAN PAPER COMPANY'S DESCRIPTION OF HOBBS SLITTER AND REWINDER

Sullivan Paper Company uses this custom-engineered Hobbs machine to slit and rewind two different widths from a single roll of paper. One width (top roll) is 10"; the other (bottom roll) is 16". Finished rolls are tightly wound, have exceptionally straight edges (1/64" tolerance) and an average diameter of 24". Control of web edge is automatic.

Takeup of paper after slitting is effected by two Hobbs-Alquist motors. These motors automatically sense torque increase, as the rolls build up (as high as 10 to 1), and their speed automatically decreases in direct proportion. Thus tension is automatically controlled at all times and the quality of the products safeguarded.

The Hobbs-Alquist winder has a squirrel cage 3-phase A.C. motor, flange mounted to a gear reducer. It can be connected directly to the rewind shaft and is entirely independent of the main machine drive. Just plug it into your present 3-phase power outlet—no transformers or converters. Then set a knob to the desired tension and walk away.

The Hobbs-Alquist Winder is much more efficient than other types of winders, saves labor, is easy to maintain (no brushes or tubes), compact, clean and flexible. It is applicable to and widely used for the conversion of plastic, rubber and textile webs, as well as paper webs.

Use the coupon to send for full information NOW.

HOBBS MANUFACTURING CO.
30-D Salisbury St., Worcester 5, Mass.

Send full information on Hobbs-Alquist Winder
Hobbs Slitter & Rewinder

Name _____
Company _____
Street & No. _____
City _____ State _____

T9-R

For more facts circle 645 on Reader Service Card

WATER HAMMER

shakes and breaks FITTINGS and EQUIPMENT unless you STOP IT!

install Josam SHOCK ABSORBERS

At an unexpected moment a connection will burst or a mechanism break from repeated shocks caused by the rapid closing of a valve or faucet, the stopping of a pump action or any other operation that arrests the normal flow.

Avoid expensive shut-downs and repairs by installing Josam Shock Absorbers. Send now for free Manual SA for details.

JOSAM MANUFACTURING COMPANY
Dept. FM-4 Michigan City, Indiana
Representatives in all principal cities.
Josam products are sold through plumbing supply wholesalers.

For more facts circle 646 on Reader Service Card

SAFER HANDLING

of INDUSTRIAL LIQUIDS!

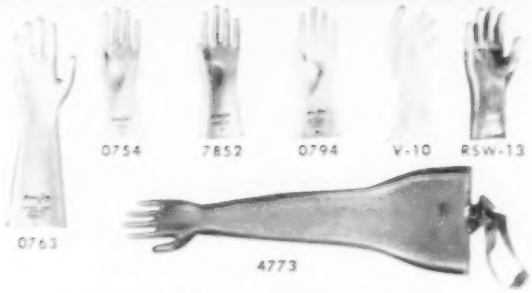
Eliminate in-plant accidents caused by slick floors and spilled inflammables! This TOKHEIM Hand Pump, for use on drums or skid-tanks, has 8' hose—or spout outlet—prevents dangerous, wasteful slopping of oils and many other liquids. Speeds production. Pumps 20 gallons per 100 strokes. Ask your dealer, your Tokheim representative or write for list of liquids.

TOKHEIM High-Volume HAND PUMPS

General Products Division
TOKHEIM CORPORATION
DESIGNERS AND BUILDERS OF SUPERIOR EQUIPMENT SINCE 1901
1664 Wabash Avenue Fort Wayne 1, Ind.

Subsidiaries: Tokheim N.V., Leiden, Holland—GenPro, Inc., Shelbyville, Ind.
Factory Branch: 475 Ninth Street, San Francisco 3, California
In Canada: Tokheim-Reeder of Canada, Ltd., 205 Yonge St., Toronto, Ont.

For more facts circle 647 on Reader Service Card



Style	Length	Material	Weight	Grip
Nimble Fingers V-10	10½"	Pylox Vinyl	Sheer	Non-Slip
Stanzoil RSW-13	10½"	Milled Neoprene	.018 (dbl)	Non-Slip
Sheergrip 0754	10½"	Natural Latex	.020 (dbl)	Smooth
Sheergrip 0794	10½"	Natural Latex	.025 (dbl)	Non-Slip
Sheergrip 0763	18"	Natural Latex	.023 (dbl)	Smooth
Sheergrip 4773	34"	Natural Latex	.035 (dbl)	Smooth
Sheergrip 7852	10½"	Neoprene Latex	.019 (dbl)	Smooth

FREE Hand Protection Analysis . . . Send a description of your job requirements (length, dexterity, wear resistance, chemicals used, importance of safe grip, hot or cold temperature extremes, fatigue factor and sizes) to our "Hand Protection Clinic." New catalog and price list available on request.

the PIONEER Rubber Company

293 Tiffin Road, Willard, Ohio

For more facts circle 648 on Reader Service Card

RESERVE YOUR COPY of United World's New Free Catalog Now . . .

MANAGEMENT AND SHOP TRAINING FILMS

Produced by the U. S. Office of Education and other Government Agencies

United World Films has long been regarded by business and industry leaders as the most reliable source of the finest 16mm sound motion pictures designed for management and shop training programs.

More than 300 of these are now fully described in United World's new Free catalog of "FILMS FOR INDUSTRY." They give comprehensive coverage to a vital selection of subjects . . . including *Materials Handling, Engineering, Supervision, Machine Shop Work, Wood Machining, Patternmaking* and more. Many of these films can be translated, via magnetic striping, into other languages and used in overseas orientation and training programs.

Reserve your copy of this new catalog now while our limited supply lasts. Fill out the coupon below and mail to the address shown.

T'Ratalgar 6-5200
1445 Park Avenue
New York 29, N. Y.

UNITED WORLD FILMS, INC.

CLIP AND MAIL

Dept. F-4
GOVERNMENT DIVISION
UNITED WORLD FILMS, INC.
1445 PARK AVENUE
NEW YORK 29, N. Y.

Gentlemen:

Please put me on your mailing list to receive the new Free Catalog . . . "FILMS FOR INDUSTRY."

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

For more facts circle 649 on Reader Service Card

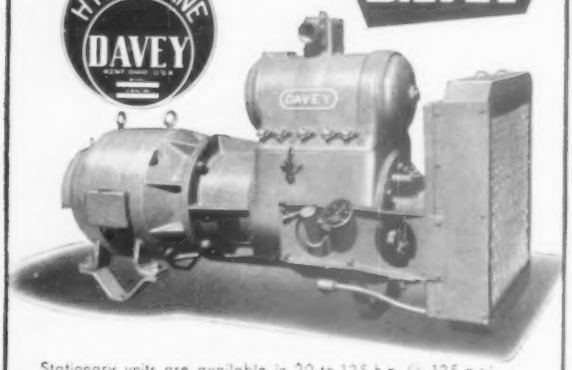
NEW!

THE Modern Air Compressor

...get the facts before you buy!

HYDROVANE DAVEY

DAVEY



Stationary units are available in 20 to 125 h.p. @ 125 p.s.i.

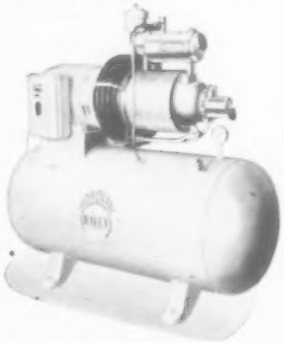
- ✓ Silent . . . vibrationless . . . compact
- ✓ Complete line . . . 2 to 125 h.p. . . . 8 to 500 c.f.m. @ 125 p.s.i.
- ✓ No complicated engineering . . . no compressor room . . . no foundation
- ✓ Easy to install and operate
- ✓ Air cooled or water cooled

Regardless of requirement, your demands can be met with the *all new* Davey Compressor.

Here is the only really modern compressor being offered to industry. Compactness, longer life, lower operating costs and lower initial costs are just a few of the advantages . . . Don't buy before you have the full story of what a Davey unit can do for you. Write or phone today for Bulletin M-132!

Distributors in all principal cities.

Tank-mounted rotary compressors are available in 2 to 5 h.p. @ 100-200 p.s.i.



INDUSTRIAL DIVISION

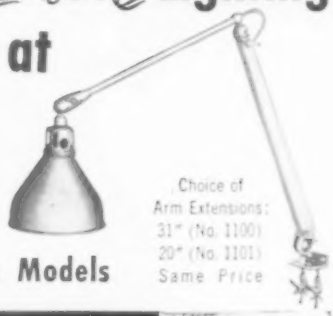
DAVEY — pioneers of air-cooled air

DAVEY COMPRESSOR CO.

Kent, Ohio

For more facts circle 650 on Reader Service Card

Air-Cooled Lighting by Dazor at Low Cost



Choice of Arm Extensions: 31" (No. 1100) 20" (No. 1101) Same Price

Adjustable-Arm Models

Light up machines and benches at rock-bottom cost and get Dazor dependability besides. New Adjustable-Arm Lamps mount solidly, hold fast in any position set. Either top- or side-mounted reflector. Air-cooled housing is safe to handle despite continuous use. Gray baked enamel over bonderizing. Call your Dazor distributor. Dazor Manufacturing Corp., St. Louis 10, Missouri.

...Makers of

DAZOR FLOATING LAMPS

For more facts circle 651 on Reader Service Card

IF YOUR PLANT USES DIAPHRAGM OPERATED VALVES YOU SHOULD KNOW SEELY

SIMPLE
RUGGED
DEPENDABLE

- Normally open or normally closed.
- For on-off; narrow band throttling, or two-position applications.
- Single or Double diaphragm motors.
- For 250 lb. line pressure; up to 406 F.
- Simple repacking and maintenance.
- Bronze bodies standard—other materials available.
- Monel, stainless steel or composition trim.
- Flat or angular seating surfaces.

Write for descriptive bulletin V-8 – or contact your Seely representative.

SEELY INSTRUMENT CO., Inc.

CONTROLS FOR INDUSTRY

By AEROMAC • P. O. Box 387 • NIAGARA FALLS, N. Y.

For more facts circle 652 on Reader Service Card

Cut Finishing Costs THROUGH INCREASED PRODUCTION

CLAMPS AND FIXTURES

Positive pressure and exact registration of the part in the mask. Reduce rejects. Free both hands for productive movements.

AUTOMATIC MACHINES

Increase production hundreds to one over hand methods. Reduce labor costs. Eliminate need of experienced workmen.

SPRAY PAINTING MASKS

A competent engineering staff will counsel with you on the most efficient technique for handling your particular requirements.

MASK WASHING MACHINES

50% faster than any other make. Cut solvent consumption. Avert production delays due to damaging of masks by hand scrubbing.

Send for Free Literature Now!

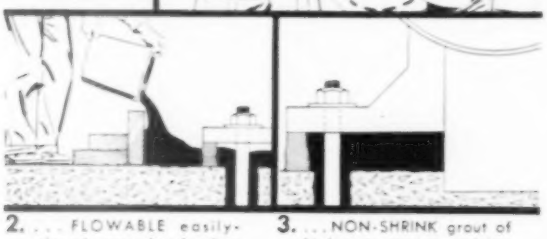
Conforming Matrix CORPORATION

420 TOLEDO FACTORIES BUILDING TOLEDO 2, OHIO

For more facts circle 653 on Reader Service Card

SUCCESSFUL EQUIPMENT GROUTING easy as 1-2-3

1. READY-TO-USE. Add only water to Embeco Pre-Mixed Grout, mix and place to produce a...



2. ... FLOWABLE easily-placed grout that hardens as a...

3. ... NON-SHRINK grout of high compressive and impact-resistant strength.

EMBECO PRE-MIXED GROUT

... Gives *lasting* results on every grouting job: heavy equipment, machinery, anchor bolts, building columns, bridge seats, etc.

Write for Free Grouting Guide.

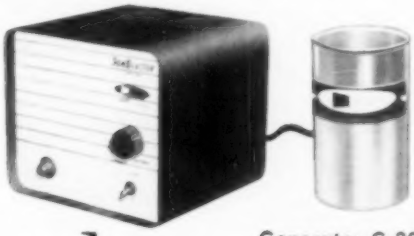
DIVISION OF AMERICAN-MARIETTA COMPANY

the MASTER BUILDERS co.

CLEVELAND 3, OHIO TORONTO 15, ONTARIO

For more facts circle 654 on Reader Service Card

NEW! *The lowest-cost ultrasonic cleaning and chemical processing unit available anywhere!*



Generator G-201, Tank NT-201

narda

SONBLASTERS $175

Now, no one need put off buying an ultrasonic cleaning or chemical processing unit because of cost! Narda's mass production techniques have done it again—this time, a top-quality 35-watt unit, complete with stainless steel transducerized tank with tremendous activity, at the lowest price in the industry—and with a full 2-year warranty besides!

What do you want to clean? Hot lab apparatus, medical instruments, electronic components, optical and technical glassware, timing mechanisms—the Narda SonBlaster cleans most any mechanical, electrical or horological part or assembly you can think of — and cleans faster, better and cheaper. It's perfect, too, for brightening, polishing, decontaminating, sterilizing, pickling, deburring, and plating; emulsifying, mixing, impregnating, degassing, and other chemical process applications.

What's more, two tank sizes are available, and there's a duty cycle timer at only $10 additional. Couple all these advantages with the low, low price, and you'll see why you can't beat the Narda Series 200 SonBlaster (as well as the larger models) for top value. Mail the coupon now for free help in determining the precise model best for you.

SPECIFICATIONS

Generator Model No.	Tank Model No.	Interior tank size (in.)	Tank Capacity	Price
G-201	NT-201	4-5/8 deep x 3-5/16 diam.	1/8 gal.	$175
G-201	NT-202	6-1/2 deep x 4-7/8 diam.	3/8 gal.	$210

Model G-202 Generator (same as G-201, but with duty cycle timer) available with either tank above, $10 additional.

The SonBlaster catalog line of ultrasonic cleaning equipment ranges from 35 watts to 2.5 Kw, and includes transducerized tanks as well as immersible transducers which can be adapted to any size or shape tank you may now be using. If ultrasonics can be applied to help improve your process, Narda will recommend the finest, most dependable equipment available — and at the lowest price in the industry!

The Narda Ultrasonics Corporation
118-160 Herricks Road
Mineola, L. I., New York
Dept. FM-3

Gentlemen:

Please send me more information about

☐ The complete Narda line
☐ Series 200 SonBlasters

Name_____
Organization_____
Address_____
City_____ Zone____ State____

the narda ultrasonics corporation

118-160 HERRICKS ROAD, MINEOLA, L. I., N. Y.

Subsidiary of The Narda Microwave Corporation

For more facts circle 655 on Reader Service Card

Accepted Procedure . . .

against

Athlete's foot

with modern

DOLGE Fungicides

DUSTING Alta-Co Foot Powder on the feet and inside shoes

FOOT BATH Alta-Co Powder dissolved in water for group prophylaxis

FLOOR WASH H.D. Fungicide diluted in 300 parts water—mop on floor

Write for Booklet on Athlete's Foot Control

Dependable DOLGE
WESTPORT, CONNECTICUT

For more facts circle 656 on Reader Service Card

Black & Decker TOOL OWNERS AGREE

Let the men who make 'em—fix 'em!

Swifty Service says:
"Local Black & Decker Factory Branch Service means longer life, better performance for your B&D Tool!"

Free Tool Inspection
Standard B&D Guarantee

Look under *Tools-Electric* in *Yellow Pages* or write us for address of nearest Factory Service Branch. The Black & Decker Mfg. Co., Dept S1602, Towson 4, Md.

B&D Black & Decker
QUALITY ELECTRIC TOOLS

For more facts circle 657 on Reader Service Card

Open plugged drains and supply lines FASTER, BETTER

with a KOLLMANN K-500

• Designed for industrial use, the K-500 makes fast work of stubborn flow line stoppages, eliminates trouble and "down time" . . . and anyone in the maintenance crew can operate it. The dolly-mounted K-500 handles up to 200' of sectional cable (400' with larger power units) for full-diameter cleaning of lines 3" to 10". Interchangeable clutch jaws quickly adapt it to lines as small as 1¼". *Every* maintenance department can readily justify this machine . . . it will pay for itself many times over.

See the full Kollmann line at your distributor, or write for literature

KOLLMANN MANUFACTURING COMPANY
486 PEACH STREET • ERIE, PENNSYLVANIA

For more facts circle 658 on Reader Service Card

Call the man from Fenestra for

Replacement doors at the lowest installed cost!

Give your maintenance department a break! And save year after year on maintenance. Replace those old, battered, sticking doors with Fenestra® Hollow Metal Doors. Fenestra Doors can't warp, swell, stick or splinter. They last a lifetime! And, in addition, you get the lowest installed cost because:

1. You buy a *complete package*—door, frame, hardware, completely machined at the factory to eliminate on-the-job cutting and fitting.
2. Erection is fast—one man with only a screw driver can install a door in minutes.
3. You have a complete selection of door types (1⅜" and 1¾"), of distinctive designs and features—*all mass produced*. Custom quality at *stock* door prices!

Ask your Fenestra representative (listed in the Yellow Pages) to help you in your selection of doors, frames and hardware—and to arrange fast delivery from stock. Or, write to Fenestra Incorporated, Dept. FM-4, 2266 East Grand Boulevard, Detroit 11, Mich.

Let the man *from Fenestra be your "door man"*

Fenestra HOLLOW METAL DOOR FRAME • HARDWARE UNITS

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An employee slips on a greasy floor and twists his knee. A severe, chronic inflammatory condition results. Medical costs and Workmen's Compensation total $10,553.77. The employer's accident rate is up. Production time is lost while a new man is trained.

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Make Your Own 30-Second Safety Test . . . Check the Coupon for FREE Sample of Alcoa Aluminum Abrasive Tread Plate.

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Alternate Monday Evenings

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Company _____
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Feel it,
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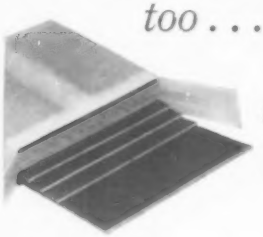

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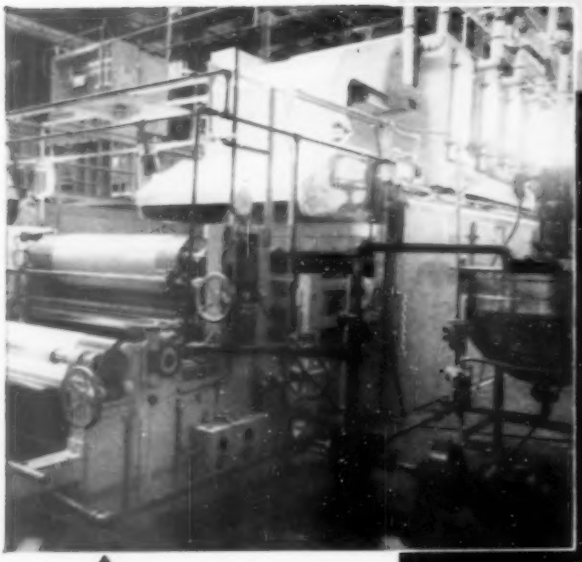
High Pressure Hot Water provides the uniform heat needed to get best results



▲ Ross Oven at Synthane Corp., for drying and curing the resin impregnated sheet used for making laminated plastic products, also gets its heat from the Ross SUPERTHERM System. Connections for this system are shown at upper right corner. The Waldron impregnator, shown in the foreground, is a product of the John Waldron Corp., New Brunswick, N. J., a member of the Ross Group of Complementing Services.

It is no secret that hot water provides a more uniform heat than steam yet this useful characteristic often is overlooked when sources of heat for processing are being considered. Likewise overlooked is the fact that high pressure hot water can be utilized at temperatures well in the 400s(F).

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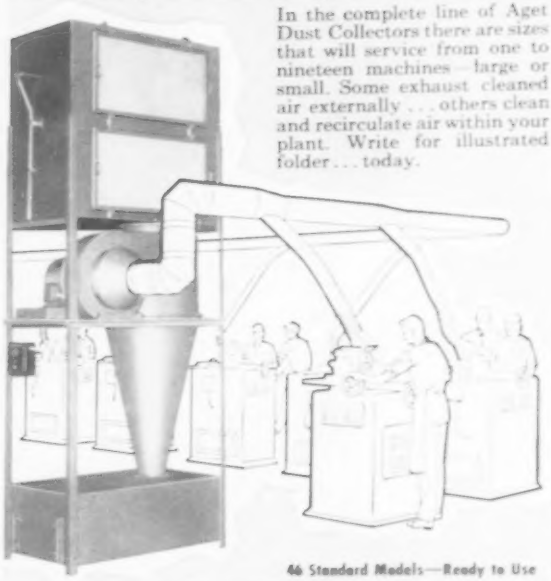

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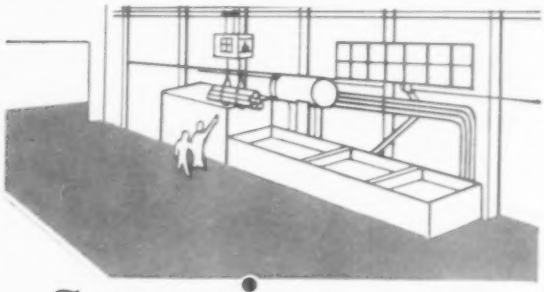

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Sauereisen Cements Co., Pittsburgh 15, Pa.

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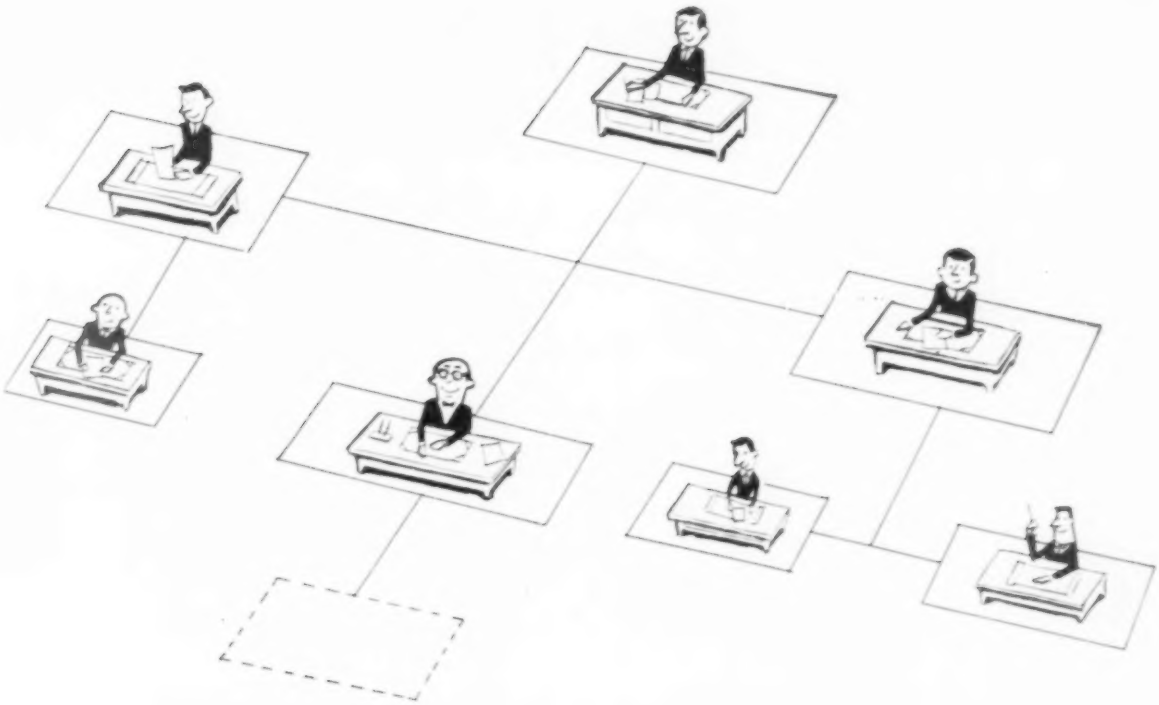

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COMPANY _____

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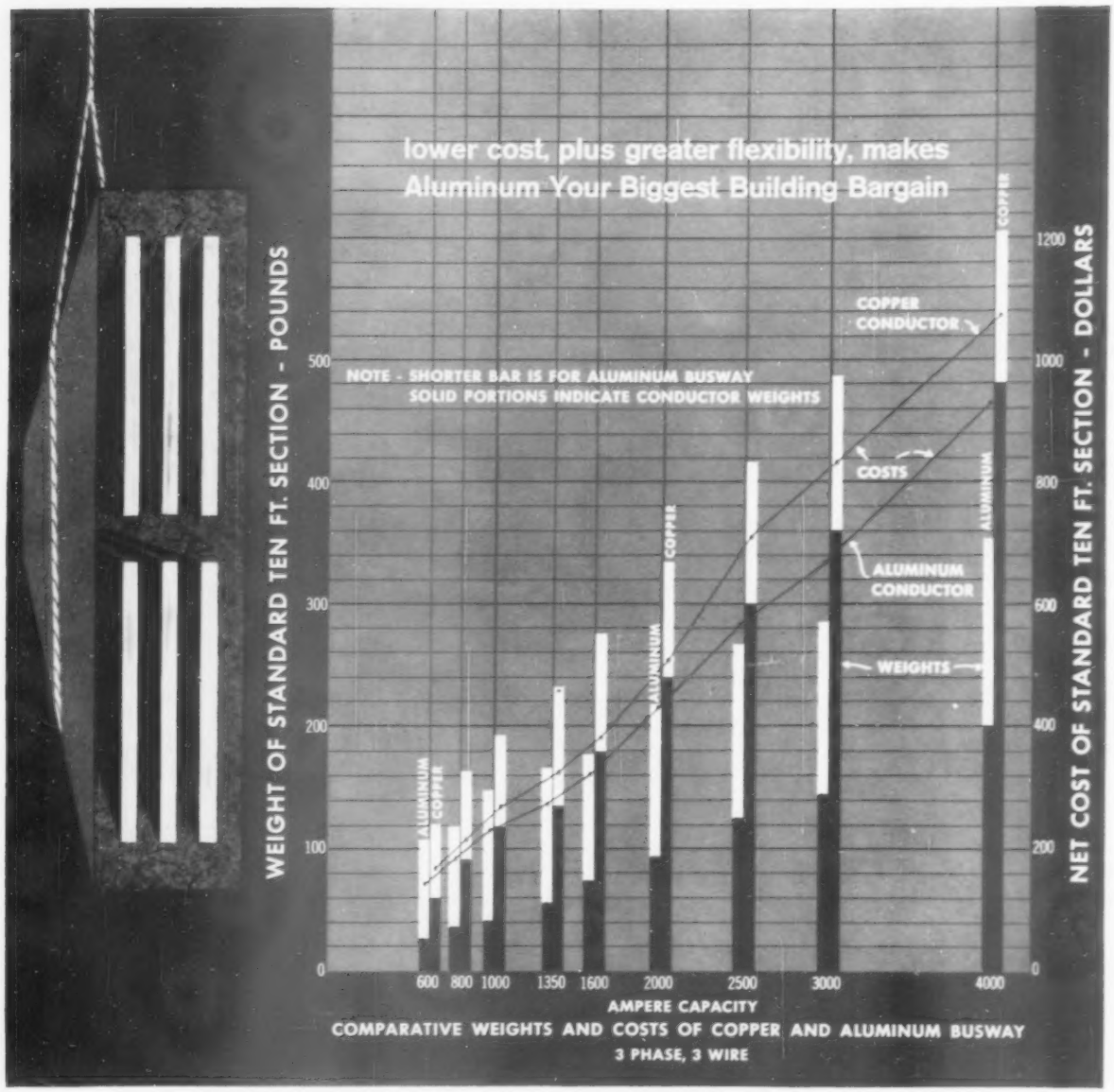

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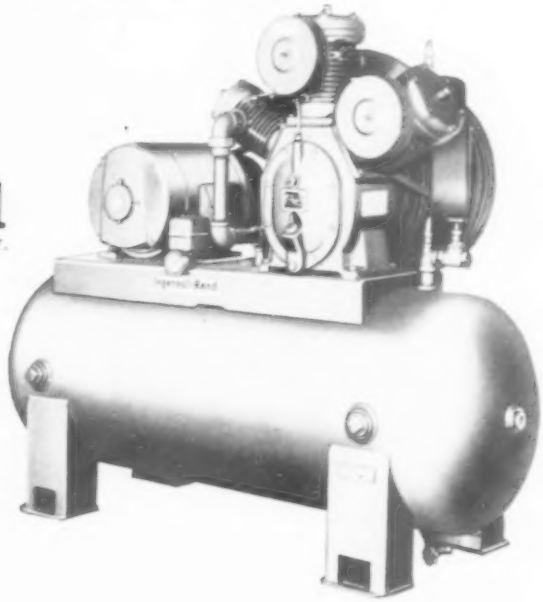

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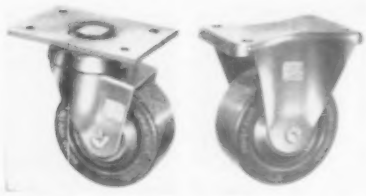

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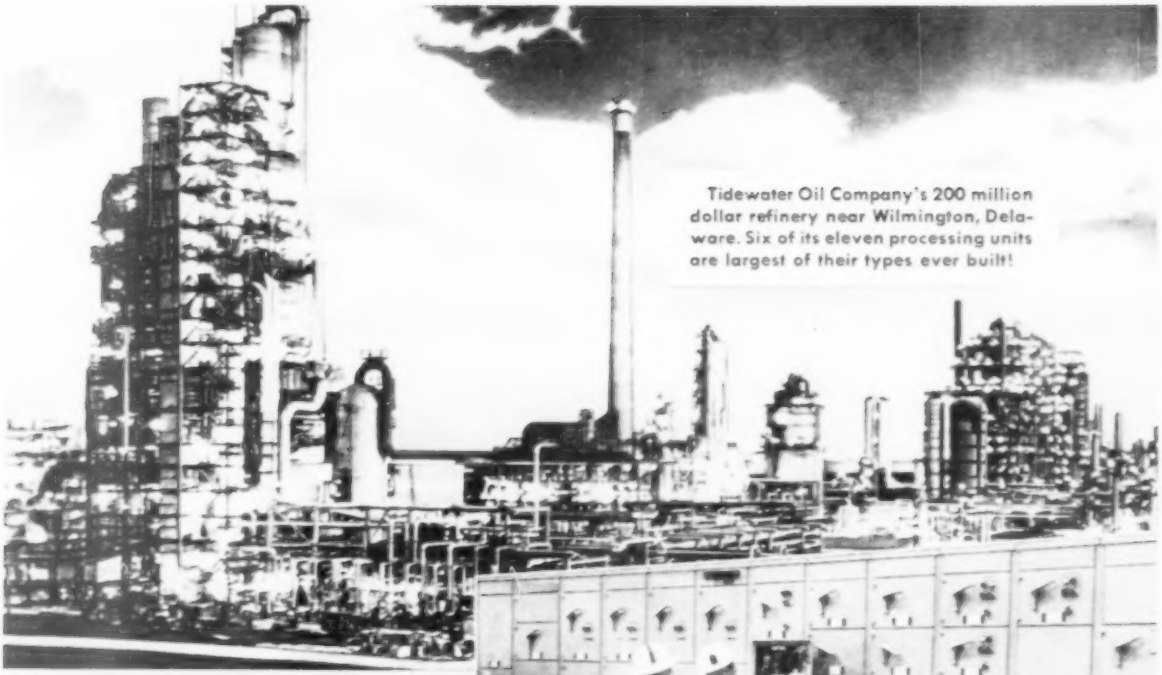

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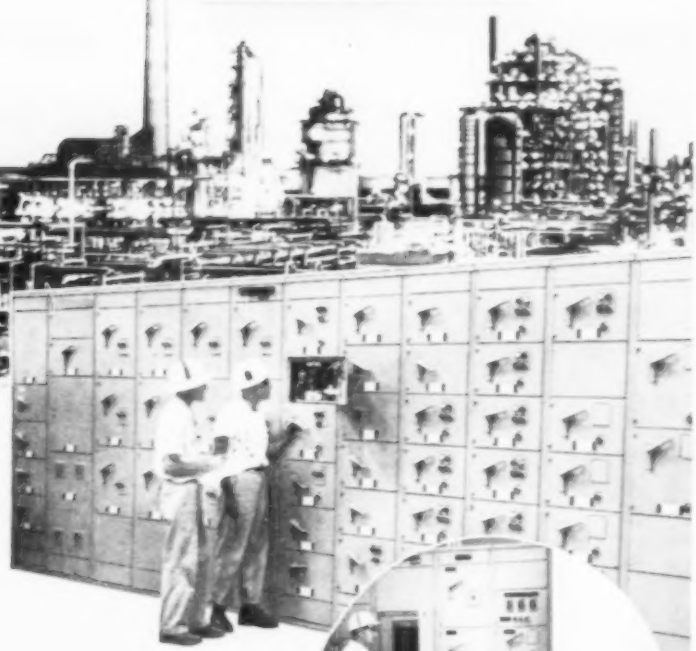

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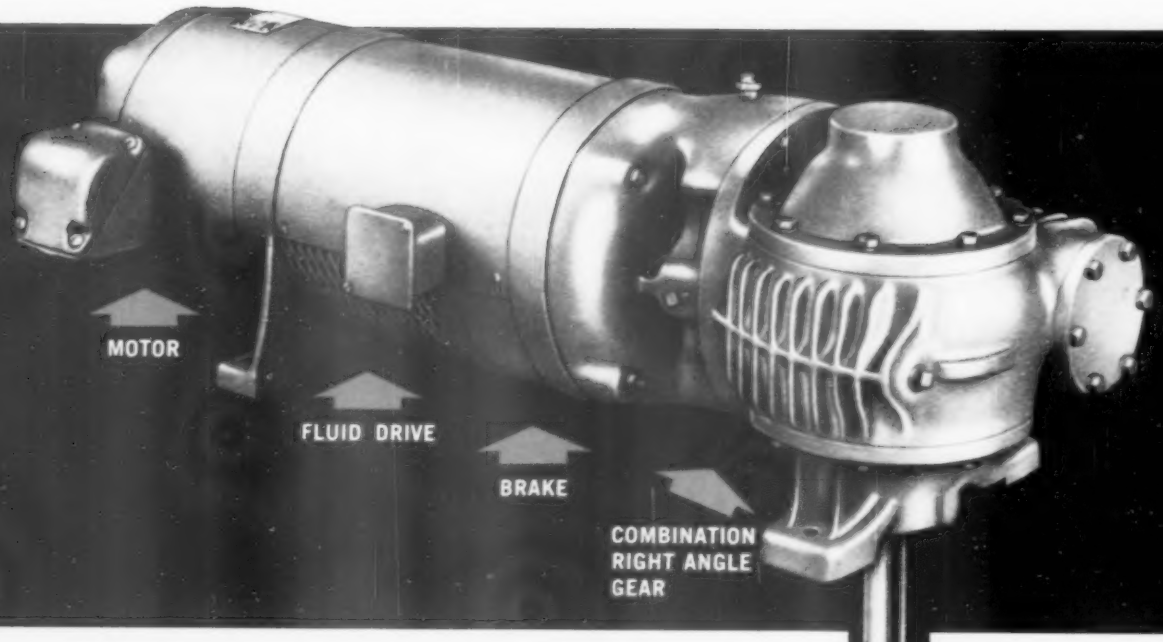

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